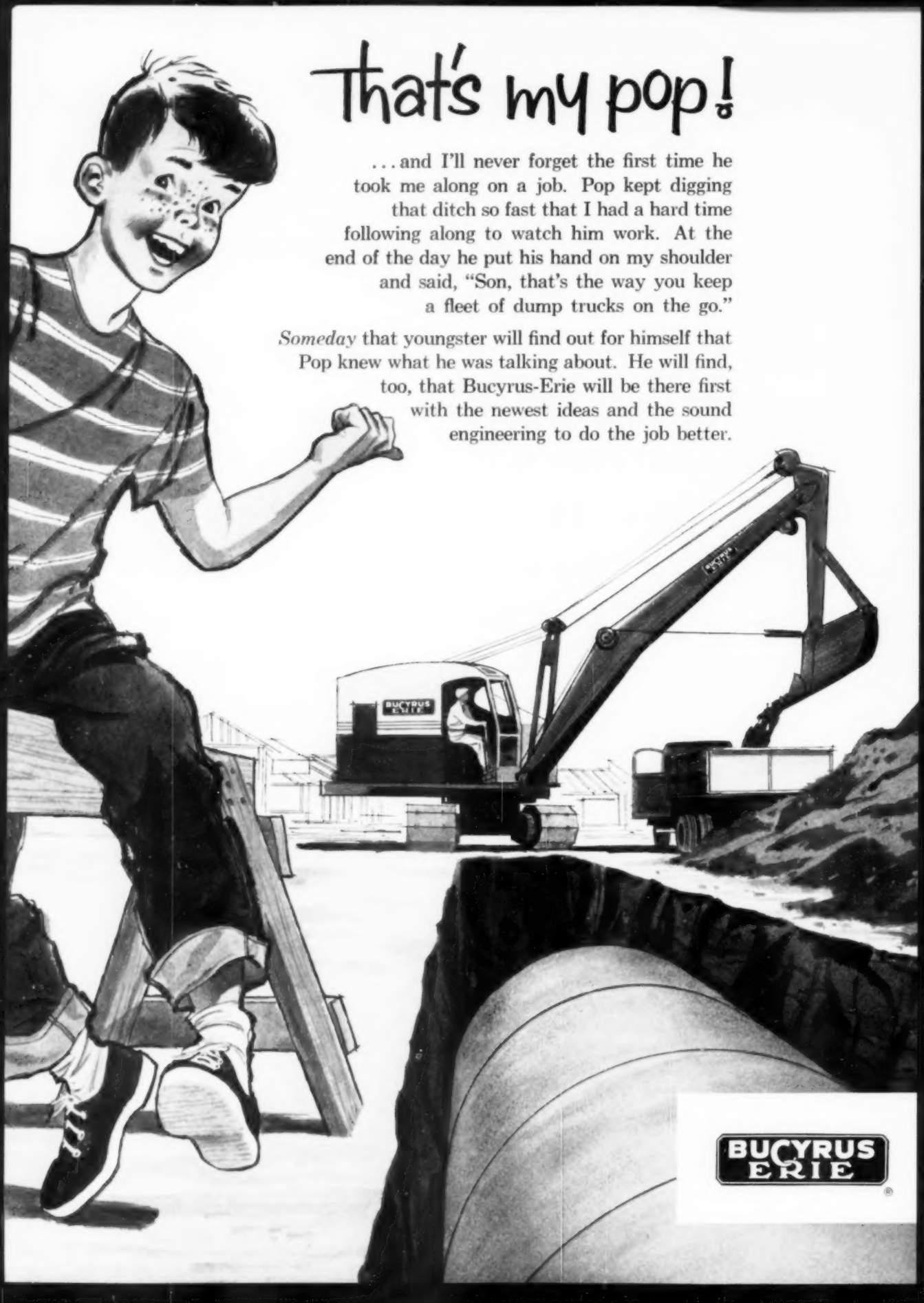
FEBRUARY

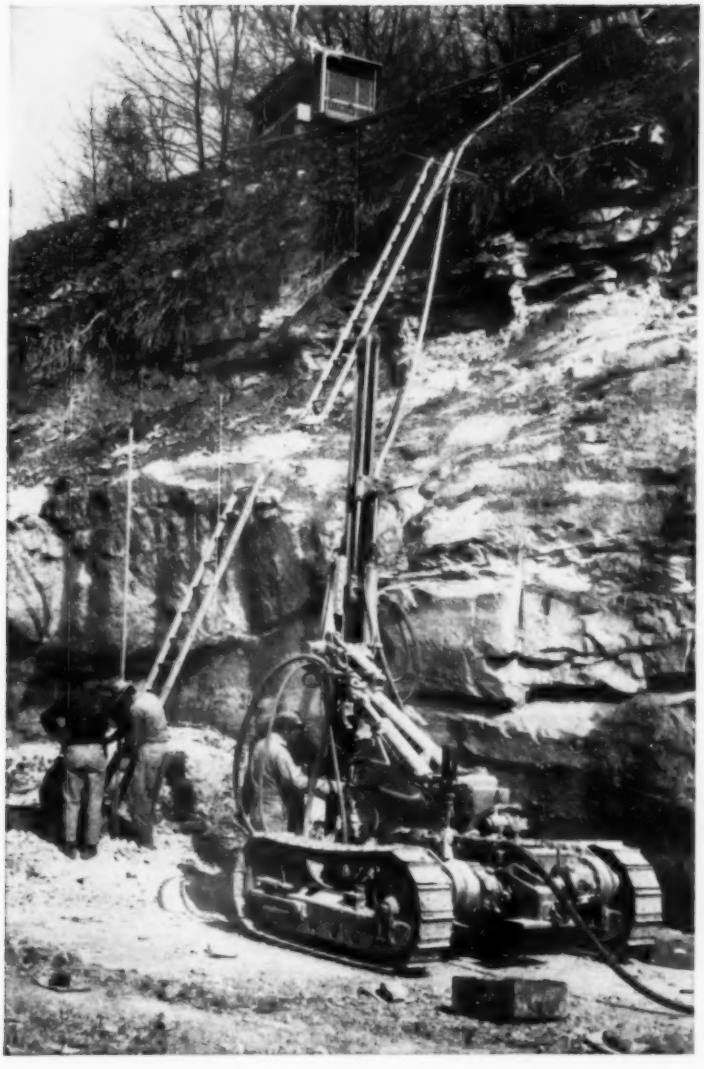
Excavating Engineer

founded 1905

1959

At Gulfstream Race Course, Hallandale, Fla., draglines perched on a stockpile load end-dumps and belly-dumps with lime rock used as sub-base for a new turf track. **See article on page 22.**


That's my pop!
. . . and I'll never forget the first time he took me along on a job. Pop kept digging that ditch so fast that I had a hard time following along to watch him work. At the end of the day he put his hand on my shoulder and said, "Son, that's the way you keep a fleet of dump trucks on the go."
Someday that youngster will find out for himself that Pop knew what he was talking about. He will find, too, that Bucyrus-Erie will be there first with the newest ideas and the sound engineering to do the job better.
BUCYRUS ERIE
BUCYRUS ERIE



Ingersoll-Rand

CRAWL-IR

"It's a DRILLIN' FOOL"

says Jim Chase, superintendent for the Haynes Construction Co.

"Does as much work as three wagon drills —and at half the price!"

These are the comments of a veteran rock drill man. And when Jim Chase calls the CRAWL-IR a "drillin' fool," you can be sure his enthusiasm is well deserved.

The unit shown above is being used by the Haynes Construction Company of Bluefield, West Virginia, to do the rock work on a new highway for Charleston's Kanawha County Airport. But rough ground and deep cuts like this were no problem to the fully mechanized CRAWL-IR drill. In fact Jim Chase, superintendent of the job, reported that it easily out-performed three wagon drills—and at half the cost.

Supplied with 100 psi air from a 600 cfm I-R Gyro-Flo compressor, the CRAWL-IR moves from hole to hole under its own power. Five large, double-acting hydraulic cylinders control *all tower motions* at the touch of a throttle. You can set up to drill in any position in a matter of minutes. And the powerful D-45 drill, with reverse rotation, permits adding and removing coupled steels in a hurry.

Time formerly spent in moving the equipment, setting it up and changing steels is now spent *drilling rock*. You get more footage per shift with far less effort than ever before. Ask your I-R man for complete information on the time-saving, cost-saving CRAWL-IR drill and long-life I-R carburized drill steel and Carset bits. Or send today for a copy of Bulletin No. 4189.

Ingersoll-Rand

5-854 11 Broadway, New York 4, N.Y.

A CONSTANT STANDARD OF QUALITY IN EVERYTHING YOU NEED FOR DRILLING ROCK

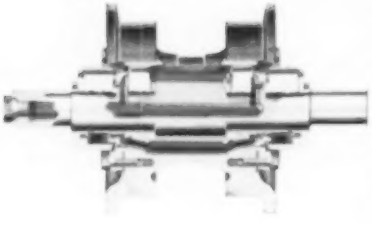
Why waste time greasing track on any of your tractors...

when you can have

Permanent Lubrication CERTIFIED

The Positive Seal PERMA-SAFE Wheel

for truck wheels, front idlers and support rollers on all models of Allis-Chalmers crawler tractors



Now...Allis-Chalmers announces PERMA-SAFE lubrication for all models in its crawler tractor line . . . climaxing more than 20 years of constant research and on-the-job experience with Positive Seal, tapered roller bearing design. Now you can forget about track-level greasing...convert that lost time to profit time. Allis-Chalmers, pioneer of extended lube intervals, lets you take this big step ahead with complete confidence.

See your nearby Allis-Chalmers dealer for the full story now. Allis-Chalmers Construction Machinery Division, Milwaukee 1, Wisconsin.

move ahead with ALLIS-CHALMERS

...power for a growing world

Advertisers

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Excavating Engineer

founded 1905

South Milwaukee, Wisconsin

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DRAGLINE BUCKETS

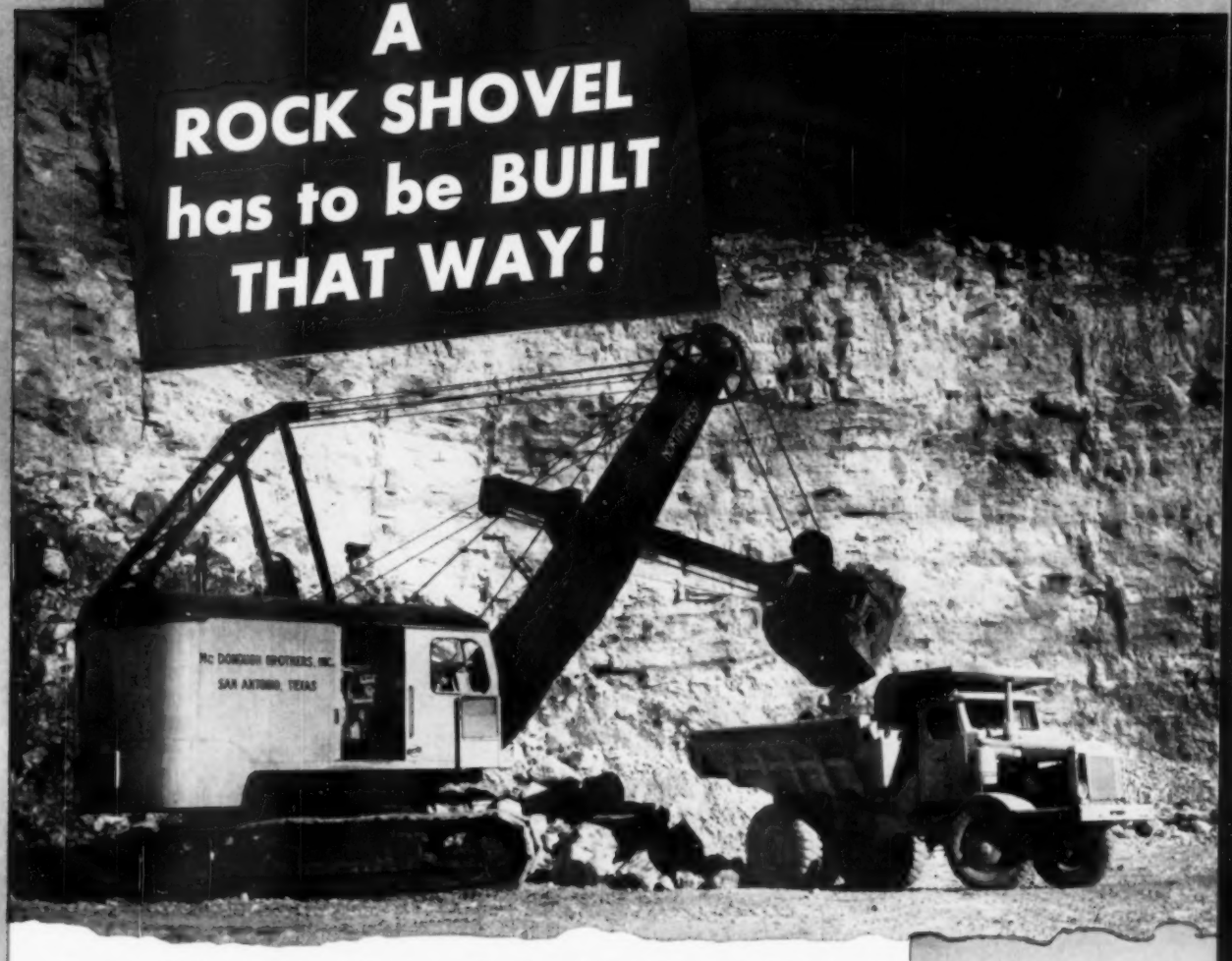
Hendrix Lightweight Dragline Buckets

"A Type for Every Digging Purpose"...
¼ to 40 Cubic Yards-Perforated or Solid

HENDRIX MANUFACTURING CO., Inc.

MANSFIELD, LOUISIANA

A ROCK SHOVEL has to be BUILT THAT WAY!



The recognized superiority of Northwest Shovel performance in rock didn't just happen. A *real* Rock Shovel has to be built that way. Northwest Shovels were engineered to handle rock digging at its worst and Northwest advantages in rock mean greater output in easy digging.

The qualities that make Northwest outstanding in any type of digging are easy to check. Start with the model you are interested in from the big 80-D 2½ yd. rig down to the workhorse of the ¾ yd. field, the Model 25.

Booms, rugged and powerful, Sticks of heavy section, the Northwest Dual Crowd—a Crowd that gives you crowding force most other Independent Crowd Shovels waste! This simple crowd with its additional crowding force makes it possible to handle harder digging and more yards per hour—per day—per month!

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Perhaps Rubber Tired Equipment will do your job better. The Northwest Truck Crane brings you a combination of advantages found in no other similar machine. 25 and 35-ton capacity.

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1506 Field Building, 135 South LaSalle Street, Chicago 3, Illinois

. . . for more details circle 302 on enclosed return postal card

NORTHWEST *Always Ready to* **GO**

NORTHWEST EQUIPMENT IS BUILT IN THE FOLLOWING SIZES

SHOVELS	CRANES	DRAGLINES	PULLSHOVELS	TRUCK CRANES
⅜ Yd. to 2½ Yd. Capacity	13-Ton to 50-Ton Capacity	¾ Yd. to 3 Yd. Capacity	¾ Yd. to 2½ Yd. Capacity	25-Ton and 35-Ton Capacity

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YARDS AHEAD

CW-226
A COMP

MODEL CW-226

2-axle, self-propelled scraper designed for rated capacities of:

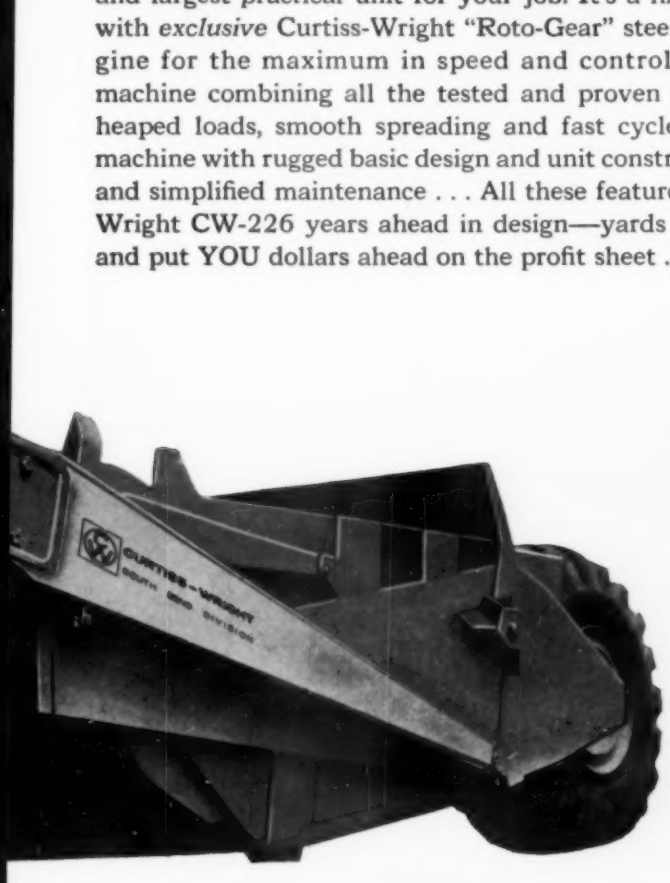
26.0 Cu. Yds. Struck
36.0 Cu. Yds. Heaped

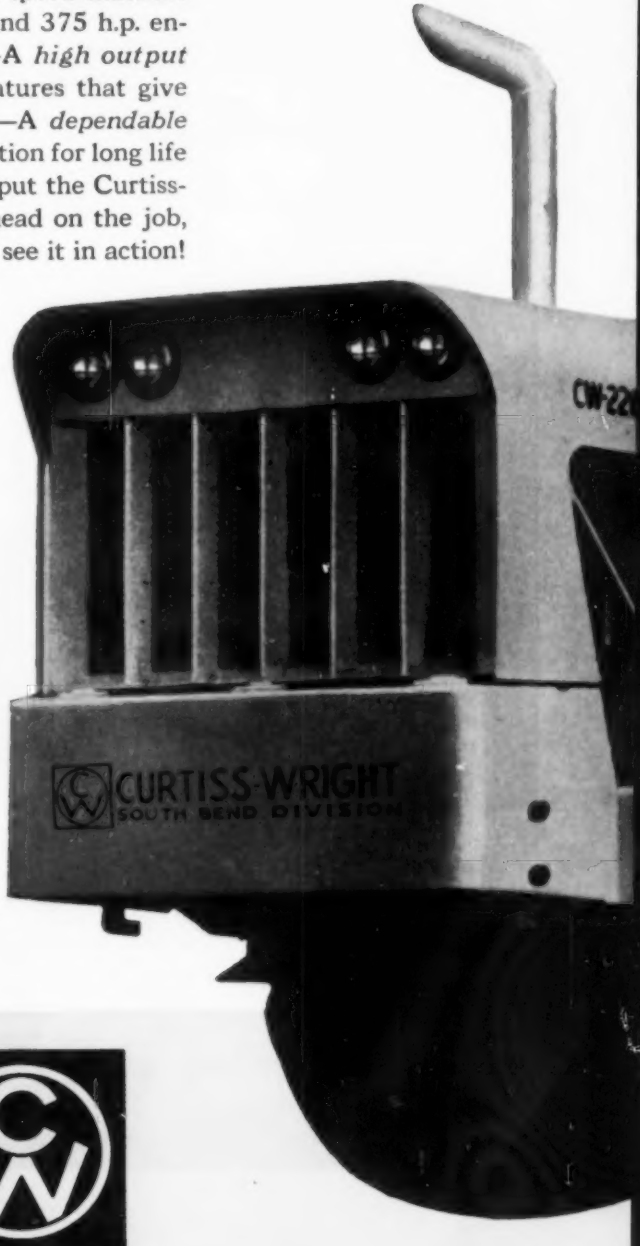
Travel Speeds	to 34.4 m.p.h.
Load Capacity	78,000 lbs.
Interchangeable with Curtiss-Wright model CWD-321 Rear Dump	21 Cu. Yds. Struck 31 Cu. Yds. Heaped 70,000 lb. Capacity

CURTISS-WRIGHT
SOUTH BEND
SOUTH BEND,

. . . NEWEST AND LARGEST OF LETE LINE OF EARTHMOVERS!

The 26 yd. CW-226 is the newest and largest addition to the Curtiss-Wright line of self-propelled scrapers . . . and the newest and largest *practical* unit for your job. It's a *high speed* machine with *exclusive* Curtiss-Wright "Roto-Gear" steer and 375 h.p. engine for the maximum in speed and control—A *high output* machine combining all the tested and proven features that give heaped loads, smooth spreading and fast cycles—A *dependable* machine with rugged basic design and unit construction for long life and simplified maintenance . . . All these features put the Curtiss-Wright CW-226 years ahead in design—yards ahead on the job, and put YOU dollars ahead on the profit sheet . . . see it in action!





CORPORATION
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INDIANA

Everybody profits ...because

you belong

in this picture!

The publisher of this magazine is often asked what kind of a man you are . . . and how many like you are receiving his magazine.

Why is he asked?

Because the *advertisers* (whose money is his chief income) insist upon knowing the types of people (by industry or profession, by title) for whom the magazine is edited — and how many are getting it.

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The BPA symbol in this magazine means that *you belong* . . . that because of your occupational interests you are qualified, in the eyes of the advertisers, to receive it.

The advertiser can thus tell whether he's getting his money's worth.

The publisher has a better sales story to prospective advertisers because his magazine is "audited."

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BPA

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NEW

MANITOWOC TRUCK CRANES

. . . Now you can get the famous Manitowoc crane performance on rubber

45 TON MODEL 2800 **60 TON MODEL 2900**

The superior precise control, cycle speed and lifting capacity you get only in Manitowoc crawler cranes is now available in two new Manitowoc truck cranes. With a full 45 ton capacity, the Model 2800 truck crane will easily handle most of your crane jobs. For the bigger, high lift jobs, the Model 2900 has a true 60 ton capacity to meet most any lifting assignment.

Both rigs feature smooth torque converter drive to provide the most accurate control for precise lift work. The double-drum, worm drive independent boom hoist provides more speed in raising and lowering, and equalizes pull on the boom to minimize cable wear. Short throw air controls are available if the rigs are put to dragline or clamshell use. Widespread, sturdy outriggers have heavy duty, bridged-aluminum pads for positive "high lift" stability. Big, rugged carriers travel at highway speeds, give you mobility that can't be matched by many smaller truck cranes.

Your Manitowoc distributor is the man to see for all the profitable advantages you get with these two new Manitowoc truck cranes . . . give him a call *now*.

- **Simple, power-saving design uses only 14 gears in the upper works. Precise, disc-type swing clutches . . . patented, plunger drum control on main clutches.**
- **Massive ring gear and roller path assembly machined from tough, rolled tire steel.**
- **Adjustable, self-aligning hook rollers with precise, 12-point adjustment to keep rollers perfectly matched with the roller path.**
- **Self-removing counterweight is standard equipment. Scientific load distribution assures legal load limit.**

Model 2900 60 Ton Truck Crane

Manitowoc

MANITOWOC ENGINEERING CORP.

(A subsidiary of The Manitowoc Company, Inc.)

MANITOWOC, WISCONSIN

CRANES	SHOVELS	DRAGLINES	TRENCH HOES
25 TON - 100 TON	1¼-YD. - 5½-YD.	1¼-YD. - 6-YD.	1¼-YD. - 3-YD.

A welder caused us to caucus

The note from an employee suggestion box read "How come a company like this hasn't got the U. S. Savings Bond Payroll Savings Plan". It was signed by a welder in the fabricating department.

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The results were amazing. Employee participation shot up to a percentage that we could take pride in. There was no "hard selling", nor was work interrupted. Our people wanted the security U. S. Savings Bonds offer them.

Today there are more Payroll savers than ever before in peacetime. Your State Director will be happy to help you install a Payroll Savings Plan or build enrollment in one already existing. Look him up in the phone book or write: Savings Bonds Division, U. S. Treasury Dept., Washington, D. C.

EXCAVATING ENGINEER

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Digging iron ore on the Mesabi Range near Aurora, Minnesota.

MARION 151-M—Power For Unmatched Digging in Mines and Quarries

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Consult Marion Mining Specialists for lower costs on your property.

MARION

MARION POWER SHOVEL COMPANY—MARION, OHIO, U. S. A.

A Division of Universal Marion Corporation

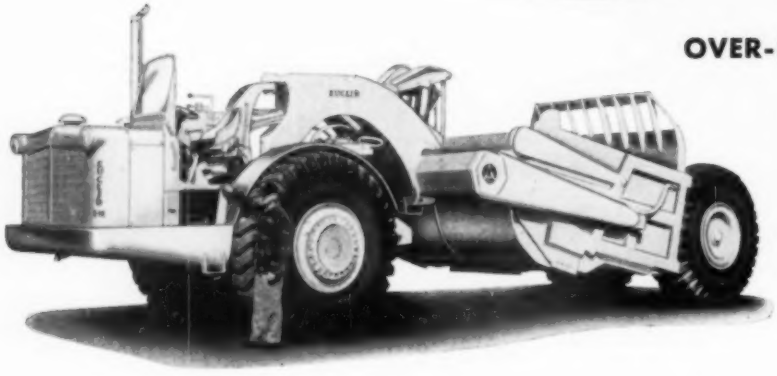
"Euc" *scrapers match any*

3 TYPES

Euclid offers you the most complete line of self-powered scrapers in the industry—and they're all job-proved to give you more work-ability and low cost yardage. No matter what your job may be—from small clean-up or grading work to big yardage projects—there's a size and type that meets your requirements.

SIX-WHEEL SCRAPERS

These models provide maximum stability for long, high speed hauls. They have capacities of 12, 18, and 24 yds. struck . . . are powered by engines of 218 to 335 h.p. and haul heaped loads of 16, 25 and 32 yds. at speeds up to 30 mph. These scraper bowls are interchangeable with bottom-dumps of 13, 17 and 25 yd. capacities.

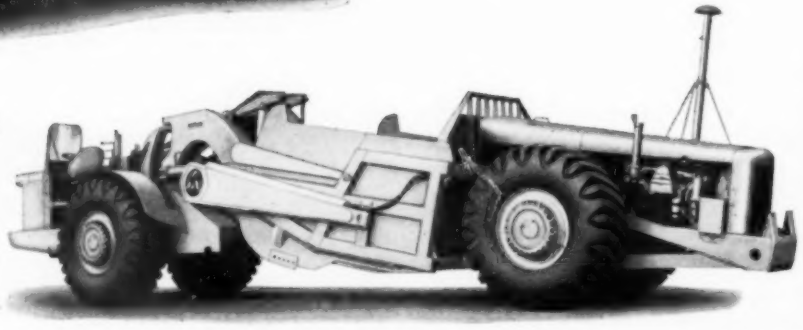


OVER-HUNG ENGINE MODELS

Payload capacities of these "Eucs" are 7, 12 and 21 yds. struck . . . 9, 17 and 30 yds. heaped. Over-hung engine design of tractors provides excellent maneuverability and ease of handling in difficult work . . . engines are 143, 218 and 325 h.p. Rear-Dump trailers of 12, 22 and 35 ton capacities are interchangeable with the scrapers.

TWIN-POWER SCRAPER

With a total of 518 h.p., this Euclid has a struck capacity of 24 yds. . . . 32 yds. heaped. Two engines, each having a separate Torqmatic Drive, enable this "Euc" to work independent of other equipment and move more yards at lowest cost on any scraper job.



Your Euclid dealer can supply performance and cost data on the Euclid Scrapers best suited to your operations. Have him show you why Euclids give you the best return on investment.

GM GENERAL MOTORS EUCLID

EUCLID EQUIPMENT

FOR MOVING EARTH, ROCK, COAL AND ORE

size or kind of job

7 MODELS

job proved for high production

TS-24

The Model TS-24 has a 300 h.p. engine for the tractor and a 218 h.p. engine for the scraper... each with a separate Torqmatic Drive. Heaped capacity at 1:1 is 32 cu. yds.... 24 yds. struck. Full 90° hydraulic steering ... 27.00 x 33 tires with 33.5 x 33 optional.

SS-12

This 4-wheel tractor model has a struck capacity of 12 cu. yds.... 17 yds. heaped ... with 218 h.p. engine and 5-speed transmission. Tire sizes are 12.00 x 25 front and 21.00 x 25 on drive and scraper wheels with 24.00 x 25 optional.

S-7

Model S-7 is equipped with 143 h.p. engine ... 18.00 x 25 tires ... 4-speed Torqmatic Drive ... full hydraulic 90° steering. Capacity is 7 cu. yds. struck and 9 yds. heaped at 1:1 slope. Optional tires are 21.00 x 25.

SS-18

The Model SS-18 has a 300 or 320 h.p. engine and 3-speed Torqmatic Drive or a standard 10-speed transmission. Capacity is 18 cu. yds. struck and 25 yds. heaped. Drive and scraper tires are 24.00 x 25 with 29.5 x 25 optional... hydraulic booster steering.

S-12

Powered by a 218 h.p. engine, the Euclid S-12 Scraper has a 5-speed transmission ... 24.00 x 25 tires ... full hydraulic 90° steering. Struck capacity is 12 cu.yds..... at 1:1 heap, 17 yds.

SS-24

A 325 or 335 h.p. engine with Allison 4-speed transmission and converter lock-up powers the Model SS-24. Struck capacity is 24 cu. yds.... 32 yds. heaped. Drive and scraper tires are 27.00 x 33 with 33.5 x 33 optional for maximum traction and flotation.

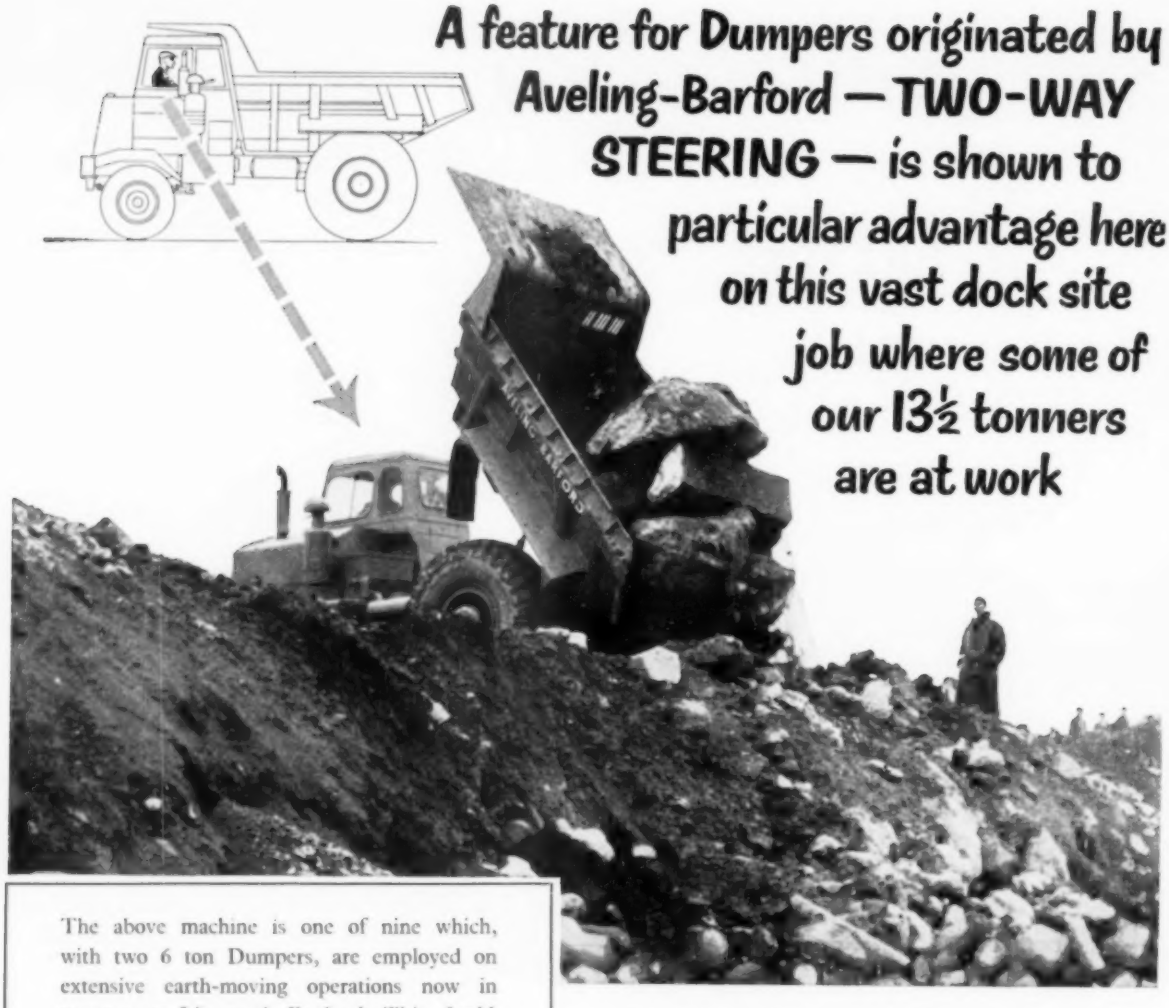
S-18

This Model S-18 has a 325 h.p. engine with 4-speed Torqmatic Drive and converter lock-up. Struck capacity is 21 cu. yds.... 30 yds. at 1:1 heap. Tires are 27.00 x 33 with 33.5 x 33 optional ... full hydraulic 90° steering.

"Euc" Scrapers have hydraulic lever action, 4 section adjustable and reversible cutting edges, unequalled accessibility for servicing and other cost-cutting advantages. Check job performance and return on investment before you decide on any scraper equipment.

EUCLID
Division of General Motors Corporation
Cleveland 17, Ohio

A feature for Dumpers originated by Aveling-Barford — TWO-WAY STEERING — is shown to particular advantage here on this vast dock site job where some of our 13½ tonners are at work



The above machine is one of nine which, with two 6 ton Dumpers, are employed on extensive earth-moving operations now in progress at Liverpool, England. This £17M Langton-Canada Improvement Scheme will provide new deepwater lock entrances and basins for the world's largest ships.

(Publication by permission of the Mersey Docks and Harbour Board. Mr. J. D. J. Sauer, M.C., M.I.C.E. Engineer-in-Chief.)

We offer the widest range of dumpers manufactured in Britain. There are seven models of payload capacities from 1 to 27 tons. Please write for illustrated literature stating which sizes interest you.

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GRANTHAM · ENGLAND

ORIGINATORS AND WORLD'S LARGEST MAKERS OF ROAD ROLLERS

for Better Value

American Cable VHS®

KAOLIN STRIP MINER REPORTS

$840 per Year Saved in Downtime Alone using Tru-lay VHS

"The most important part of my job is to keep men and machines producing on a profitable day-to-day basis," says O. E. Robinson, Mine Superintendent, Thiele Kaolin Company, Sandersville, Ga. "Since we started using TRU-LAY VHS on our B-E 6-yard Dragline, we've been able to reduce equipment 'downtime' costs because of wire rope failure to the lowest they've ever been. Our records show we now get an average 8 weeks' service from VHS where 6 weeks' service was tops for our previous brand."

Surely you, too, will want to find out how TRU-LAY VHS can bring big wire rope savings to you. For TRU-LAY VHS saves you money where it counts the most—on the rugged jobs that put any wire rope to its severest test, such jobs as draglines, shovel hoist ropes, scraper and dozer cable.

How is it that TRU-LAY VHS outlasts and outperforms any other wire rope made? It's because TRU-LAY VHS is not just another "brand" of wire rope—it's an entirely new grade of wire rope which is in a class by itself. Before VHS was introduced 3 years ago, TRU-LAY Preformed Improved Plow Steel was the highest rated wire rope you could buy. Today, it still is your wisest choice for many uses. But on those jobs where an extra bonus in strength, toughness, and resistance to wear are called for, you'll be dollars ahead to insist on TRU-LAY VHS.

Ample distributor stocks anywhere in the country now assure you of immediate delivery and an uninterrupted supply of VHS. Ask for VHS next time you order.

ACCO

American Cable Division

AMERICAN CHAIN & CABLE

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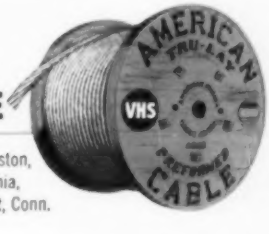

New ROGERS Greatness IN SIZE AND VERSATILITY

Greater Value in Improved Conventional Trailers

It was logical for Hoffman Trucks, Inc. of Belleville, New Jersey, prominent among leading heavy movers, to come to Rogers Brothers Corporation for the design and construction of a most unusual trailer to meet their special needs. Its tremendous size is indicated in contrast with a Rogers 25-ton TVT top value trailer.

Conservatively rated at 200 tons it mounts 40-12x24-14 ply tires on axles which oscillate lengthwise and crosswise to equally distribute the load.

THE FRONT GOOSENECK rides on a dolly to increase the number of tires, improve maneuverability and absorb part of the load on the tractor. The trailer can be hauled with or without the dolly.

A self-powered hydraulic mechanism will raise or lower the deck for greater roadway or overhead clearance as required.

The unit at the rear supplies power for steering in addition to its use on the deck height and gooseneck removal.

THE DETACHABLE REAR ASSEMBLY consists of two — 8 tire double oscillating units with two removable 4 tire units attached to the walking beam. This places a total of 24 tires under the rear of the trailer.

The detachable axles are caster mounted to track with the trailer in forward movement. Power steering is applied to the caster axle for sharp turns or for steering in a reverse direction.

The detachable assembly and the front dolly may be removed for standard semi-operation.

To meet length limitations and permit faster return trips, a "Stub" connector is substituted for the regular deck which is carried on the goosenecks. This shortens the overall length approximately 30 feet.

GET THE ROGERS CATALOG *or request additional information if desired. If you have an unusual problem the advice of Rogers' engineers is available without cost or obligation.*

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This great performance story began more than two years ago— and it's getting better all the time!

More than 50 Allis-Chalmers HD-21's are handling Toquepala's toughest jobs for Utah Construction Co. and Morrison-Knudsen Co., Inc.

Working up to 14,000 feet high in the Peruvian Andes, to develop a large mining project for the Southern Peru Copper Corporation, these tractors have been constructing roads . . . building railroads . . . preparing sites for entire new towns.

They've faced some of the toughest conditions in the world . . . rock, sand, dust, cold and high altitude all rolled into one. After two years of round-the-clock operation, these machines have piled up an outstanding performance and on-the-job record.

The Toquepala story is another good reason why you should have all the facts on the new HD-21. Across America, as in the Andes, leading construction men are discovering that the HD-21 is the long-life, big-production crawler tractor they've been looking for. See your Allis-Chalmers construction machinery dealer. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

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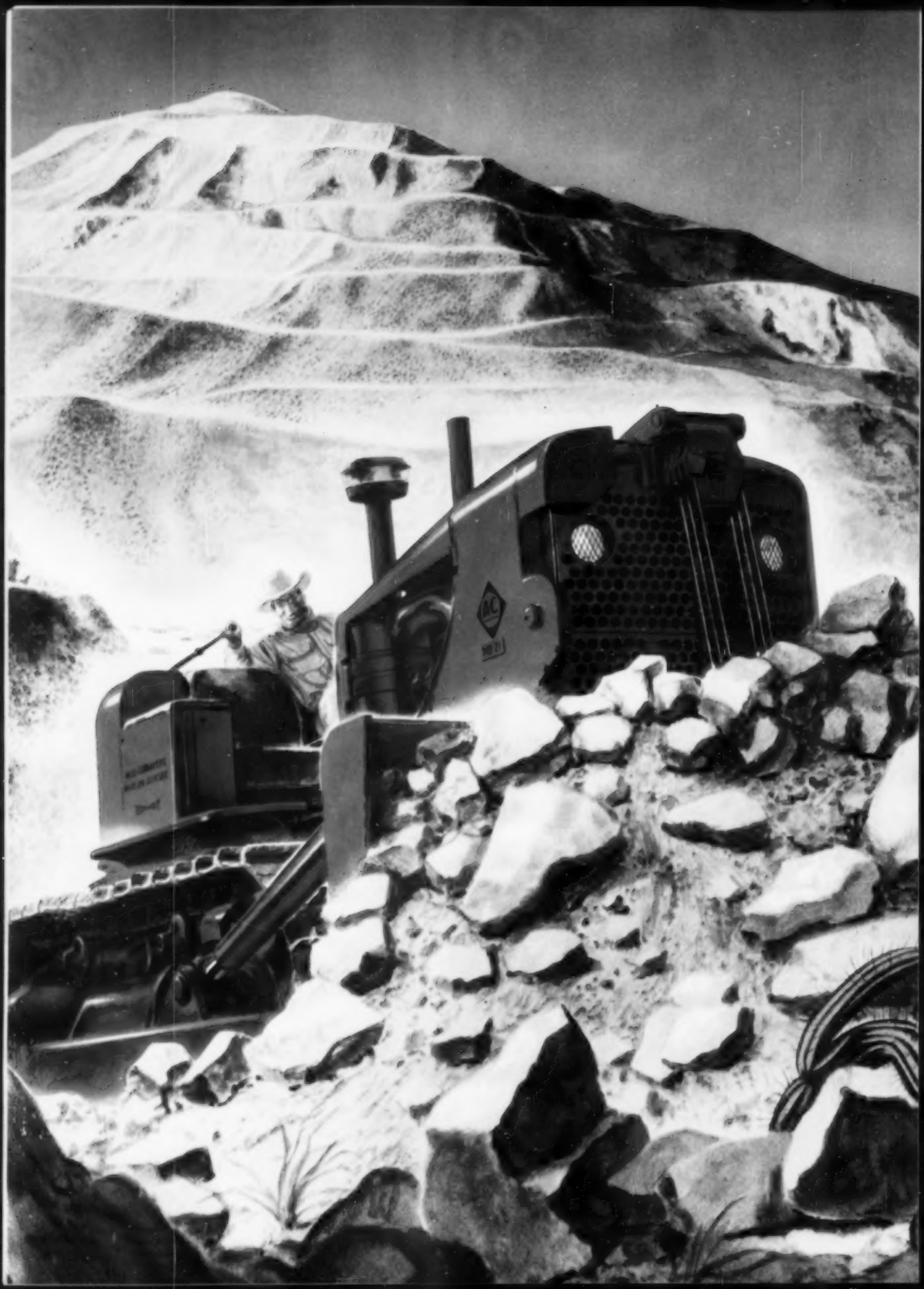

Working on New Frontiers high in the Peruvian Andes

Mining specialists . . . men of construction . . . and a great fleet of giant Allis-Chalmers crawler tractors are changing a remote, mountain-top desert into a modern mining center.

Toquepala (*pronounced Toe-kay-páh-la*) is its name—a wilderness hidden deep in the ancient land of the Inca Indians, so bleak and devoid of rain it's truly a mountain-top desert. There, 11,500 feet above sea level, one of the biggest mining projects in history is now under way.

Among the first machines moved ashore at the start of this venture were big Allis-Chalmers tractor-bulldozers, and today they're part of the team that is breaking through the barriers to Toquepala. To span the 100 miles from the mine to the nearest seaport, these giant tractors are pushing aside sand and rock to help build a network of roads and a railroad . . . and they're biting into mountainous terrain to level a site for a new town of 10,000 people.

Thus, the might of modern construction machinery is helping to unlock the treasures of Toquepala, considered inaccessible just a few years ago. And when the ore is ready for processing, 14 huge Allis-Chalmers mills will start grinding up this 400-million-ton mountain of copper ore at the rate of 30,000 tons a day . . . free the valuable mineral from the waste and prepare it for concentration, smelting and refining. Then, Toquepala will be one of the world's great copper mining centers, and long-range needs for this vital metal will be supplemented by a new source of supply.

From trail blazing to processing, this mammoth project typifies Allis-Chalmers service to the mining industry—through an unusually wide range of construction, power and processing equipment. It also typifies Engineering in Action . . . bringing better living to more people wherever it goes. ALLIS-CHALMERS, GENERAL OFFICES, MILWAUKEE 1, WIS.

Toquepala is a project of the Southern Peru Copper Corporation, which is stripping more than 120 million tons of overburden to reach the actual ore deposit at the mine. Major construction work for the roads, railroad and town site is being handled by two famous American contractors, Utah Construction Company and Morrison-Knudsen Company, Inc.

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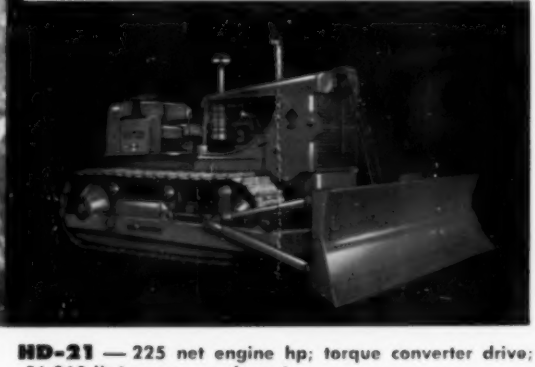
Allis-Chalmers HD-21's are the tractors for your tough jobs

Big Allis-Chalmers tractor-dozers cut the rocky, mountain country to size to develop a town site.

Men and machinery conquer the mountain-top desert . . . push aside rock and sand to build access roads.



HD-21 — 225 net engine hp; torque converter drive; 56,260 lb (approx. as shown)

You, too, can have the outstanding performance Utah Construction Company and Morrison-Knudsen Company, Inc. are getting from the more than 50 Allis-Chalmers HD-21's at Toquepala. Call your Allis-Chalmers dealer now. He will demonstrate the HD-21 on your job at your convenience.

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A 51-B dragline, on rental from H. L. Mills Construction Co., loads an 18-yd. Euclid every three minutes with its 3-yd. bucket.

Hooper Rebuilds Florida's Gulfstream Race Course

by R. S. Thrasher

Million-yard renovation of famed horse racing park has a six-month time limit.

WHEN James Donn, president of Gulfstream Race Course in Hallandale, Fla., contemplates changes, he calls for them in a big way. Several seasons ago he completed the major job of rebuilding the clubhouse. Immediately following last year's racing season Donn was in the middle of a much greater task of rebuilding and enlarging parking facilities and building a large turf track inside the present dirt track. Improvements have been made in landscape patterns and a silvery lake has been created inside the track to please the eyes of spectators at racing events.

The excavation phase of the work ran over a million yards of coral rock.

In order to get the park in shape for this winter, he had only between the months of May and November to complete the job. Donn's big problem of getting the job done quickly had a simple solution—let Hooper do it.

Hauling Fleet

F. W. Hooper Construction Co. of Miami is one of Florida's largest earthmovers and has a reputation of knowing its business. Hooper started off the job by moving in with a fleet of 10 Euclid 18-yd. bottom-dumps and a dragline team consisting of one Lima 750 and Bucyrus-Erie models 88-B, 51-B and 38-B. The 51-B was on rental from H. L. Mills Construction Co.

John Stanton, superintendent for Hooper, got off and running with the 88-B dragline working two 10-hour shifts, seven days a week digging coral rock from the lake inside the present track. This material was used as the subbase of the new turf track and to enlarge the parking lot facilities.

Vern Hornsby, who has been with the Hooper organization 23 years at the controls of excavators, set the pace on the

Bottom-dump Euclid carries coral rock from stockpile to dump areas where the material will be used as sub-base for a new turf track and for enlarging parking lots.

first cut of the digging operation. Taking a 35-ft. wide cut to a depth of 25 feet below waterline, Hornsby stocked an average of 4,000 cubic yards of material per 10-hour shift. This average remained constant throughout the job.

The 88-B was equipped with 90 feet of boom and a 4-yd. Page heavy-duty bucket increased to a 4½ yards capacity with built-up side boards.

After allowing the material to dry out in the stockpile for several days, Supt. Stanton signaled for the Euclids to move in along with a Bucyrus-Erie 51-B dragline to load out the first cut.

Using a 3-yd. Esco drag bucket and 70 feet of boom, the 51-B loaded out an 18-yd. bottom-dump every three minutes. This operation allowed several machines to be spotted in loading position at one time, assuring a continuous operation.

The limestone material was carried by the Euclids from the lake site in the center of the race course to be distributed in the front of the grounds for parking lot sub-base and also for use as sub-base of the new turf track.

As the job moved on into several weeks, Stanton called in a Lima 750 equipped with 2½-yd. Hendrix bucket to load out a variety of trucks that were used for spot fill jobs. This method of loading out from both ends of a stockpile cut down traffic jams in the pit and also removed the material before the 88-B caught the smaller draglines on the next cut.

Here are Supt. John Stanton and Operator Vern Hornsby, shown at the controls of the 88-B dragline. Stanton has been with the Hooper firm 29 years; Hornsby 23 years.

A 38-B dragline with a 2½-yd. Hendrix bucket moved in as the last cut was loaded out. Its job was a two-fold task of sloping the sides of the cut, which became the finished shoreline of the lake, and cleaning out excess material.

Close Supervision

With different phases of the job all spread out and going at the same time, Supt. John Stanton kept men and machines moving.

"Knowing Stanton like I do," said Operator Vern Hornsby, "it comes easy. Just let one Euclid drop out of line or a drag cable snap and in minutes he's there. He keeps both ears to the wind all the time."

The sub-base for the new parking area was built up by dumping a foot of lime rock over the existing lots. After a 12-ton roller compacted the soft material, a Caterpillar D8 dozer and a No. 12 grader ran the finished grade.

A surface treatment of sand and liquid asphalt topped out the rock fill.

A lake is formed as soft coral rock is dug by dragline whose 4-yd. bucket has been built up to 4½-yd. size with sideboards.

Rocky Show at Hills Creek Dam

by Ray Day

Site preparation for Oregon dam requires rock scaling and excavation.

PREPARATION of abutments and foundation for a major earthfill dam in a narrow canyon is one of the most tedious, exasperating jobs a contractor can get. If the foundation and abutments are covered with hard-to-dig overburden, the job is always bad.

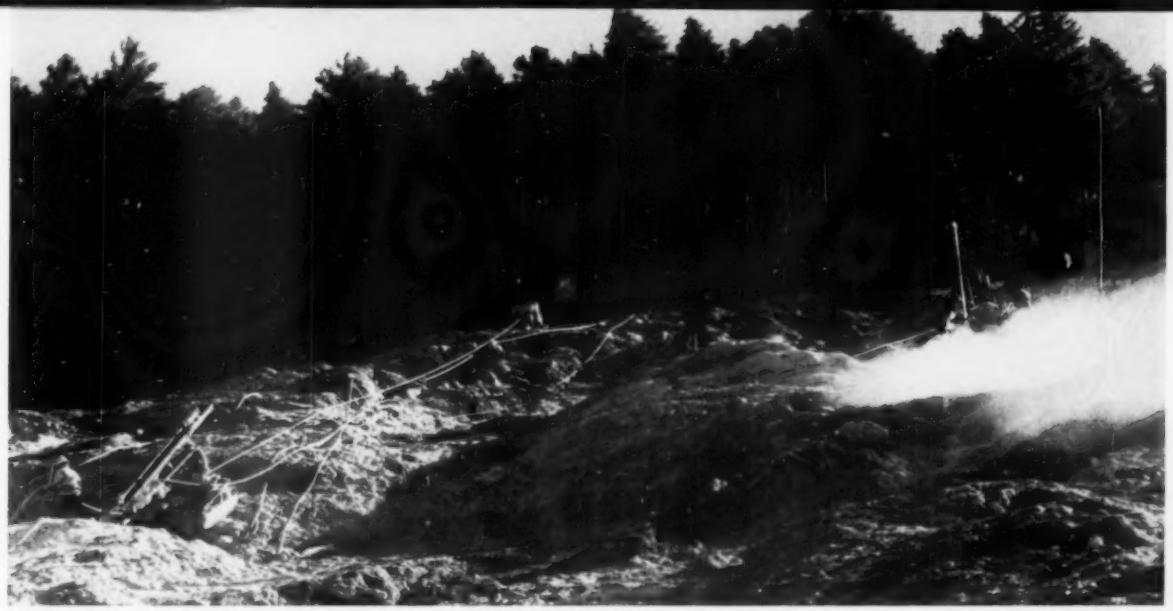
Joint venture firms Green Construction Co., Des Moines, Iowa, and Tecon Corp., Dallas, Tex., have such an assignment in central Oregon near Oakridge. Hills Creek Dam is their job. It's being built under a $20 million contract with the Portland District of the U. S. Army Corps of Engineers.

The 1,920-ft. long, 338-ft. high dam has, in addition to all the usual problems, two unusual ones. A six-week work stoppage during the summer of 1958 set back several vital operations, including river diversion, so that there was more than average flood danger. A second factor was the necessity for keeping county road and U. S. Forest Service highway traffic open through the construction area during all of the first-stage construction work. It was necessary because the area upstream from the reservoir produces excellent timber for the lumbering mills at Eugene, Ore. Many logging outfits operate in the area.

The joint-venture contract includes all construction work related directly to the dam. The diversion tunnel was drilled last year under separate contract, and present work includes only the excavation for the powerhouse. The powerhouse and generators are to be built under a future contract. But the Green-Tecon job does include a regulating tunnel and penstocks, which have been subcontracted to Northwood Construction Co., Ltd. of Vancouver, British Columbia.

Hills Creek Dam is one of the major units on the middle fork of the Wilamette River. Its location is about 26.5 miles upstream from Lookout Point Dam and about 40 miles southeast of

Foundation of dam is being excavated behind the protection of a cofferdam. In background is dam's rocky right abutment.



Sheer rock walls provide spectacular drilling. Gardner-Denver drills were often suspended by cables anchored on tractors.

Eugene. The Hills Creek project is closely related to Lookout Point and to Dexter dams, below. The three structures will be operated as a unit for control of floods and power generation.

The Hills Creek plan of improvement calls for an earth and gravel fill type embankment, consisting of three principal zones. The powerhouse will have an installed generating capacity of 30,000 kilowatts.

A gated, chute-type spillway and a tunnel outlet will be provided in the right abutment. The reservoir will provide 249,000 acre-feet of usable storage, of which 200,000 acre-feet will be available for flood regulation and multiple purpose use, and 49,000 acre-feet exclusively for power production. Cost of the project was at first estimated to be $34.5 million, but this figure has recently been upped to approximately $40 million.

Big Rock Fill

Quantities speak for themselves as an index of the job's size. For example, there are 900,000 cubic yards of rock excavation; 1,250,000 cubic yards of impervious core embankment production; 8,000,000 cubic yards of gravel zone embankment; 530,000 cubic yards of rock fill; and 900,000 cubic yards of random rock.

Random rock and quarried rock fill will form two minor zones in addition to the three principal ones. Material for the impervious embankment is located downstream on the right side of the river about one mile below the dam. Gravel for the pervious zones will be dug from the reservoir upstream from the dam, and the random rock fill material will represent a great deal of the excavation along the right abutment. The latter excavation was under way when *Excavating Engineer* visited the project.

Work officially began in July 1957 on the Green-Tecon contract. Preparation of the dam for rapid fill placement, which is expected to continue this year and 1960, has taken the following forms:

1. One of the first items of work was to build detour roads and two detour bridges through the area to carry logging trucks and other traffic.

2. Rock excavation was started on the right abutment, and an area was cleared on the foundation so that some fill—in the form of a diversion cofferdam—could be started.

3. Gravel from the diversion channel excavation and some imported gravel from the main borrow pit were brought in. More stripping of the dam foundation was done with scrapers.

4. The quarry site for the production of quarried rock and riprap was logged

Cleanup of rock blasted down from one of the abutment walls in a series of high, vertical steps is assigned to a D8 dozer. Operator is shielded from falling material.

This Air Trac is one of six working on the job. They have DH-125 guns, and are equipped with G-D series 600 drilling steel and Timken rock bits of 2¾-in. diameter.

and cleared, and the main disposal area also was logged. Because about 5,000 cubic yards of riprap were needed immediately for the protection of the diversion channel slopes, an exploratory coyote shot was made in the quarry to determine the feasibility of using the coyote method in the future. The first shot produced the necessary 5,000 yards and was quite successful, so that method will be continued.

5. Foundation stripping continued along with the first of two excavation stages on the right abutment. In the first stage, incidentally, excavation will be carried down to elevation 1548, which represents the top of the dam. Stage 2 on the right abutment will consist of excavation for the spillway and intake structure. Coincidentally with stage 1, excavation has also been started on the left dam abutment.

Shovel Fleet

Gearing up to meet both immediate and future demands, the contractors arranged for delivery of a large fleet of new and used shovels and draglines. One of the new machines picked was a Bucyrus-Erie 88-B shovel with a 4-yd. dipper, which was earmarked for excavation use on both abutments and loading of rock excavation in the diversion channel. A 54-B with 2½-yd. dipper was picked for rock and structure excavation and gravel loading.

A 2-yd. 51-B was purchased for all-around use in tight places too small for the bigger shovels; for the production and loading of riprap; and for initial building of haul roads.

A Lima 1601 shovel was brought in for excavation on the right abutment rock, assisting the 88-B and 54-B at that point. A Marion 111-M dragline was purchased for gravel borrow area loading, and for miscellaneous work as a crane in concrete placement.

Biggest machine of the lot was a Manitowoc model 4500 dragline, carrying a 100-ft. boom and an 8-yd. Esco bucket. While this machine was used to some extent on foundation and core trench stripping, its principal use will be in loading Euclids with the 8 million yards of gravel borrow going into the dam.

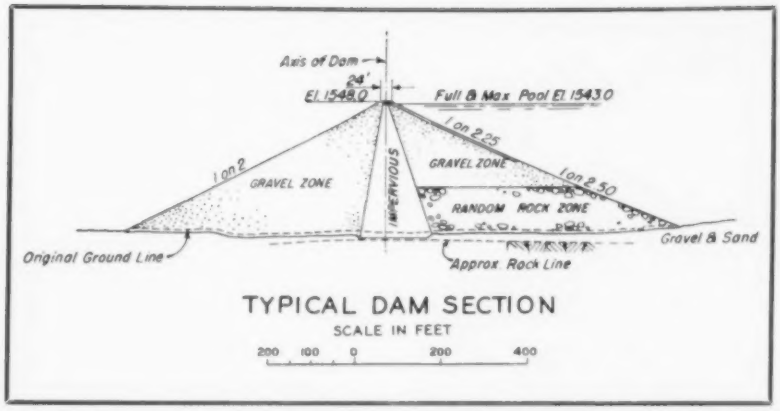
Dam is on Middle Fork of the Wilamette River 40 miles southeast of Eugene, Ore.

Complementing this shovel fleet were heavy hauling units. Five new International Payhaulers were purchased outright, and four more were rented from G. D. Dennis & Sons of Portland. Six Euclid 63-TD end-dump trucks were brought in, along with seventeen 23-TD belly-dumps. Three Caterpillar DW21's with Athey rock wagons completed the hauling unit fleet. There are enough hauling units so that each spread has a spare, thus permitting service work to be done on other units.

Excavation work along the right abutment has been unusually spectacular, chiefly because a 200-ft. cut must be made almost vertically just to get down to the elevation of the top of the dam. Below that point the second stage work will take over, and it, too, will be steep and dangerous.

Rock throughout this locality is volcanic, with the right abutment consisting chiefly of tuff, and the left abutment and rock quarry consisting chiefly of andesite. A meeting point for these two materials exists somewhere along the foundation line, and will be treated with high-pressure grouting when the area is all opened up. Since

Gravel for pervious zones of the dam is dug from the river bed area by this 8-yd. Manitowoc 4500 loading into Athey rock wagons pulled by Cat DW21's.



Hills Creek Dam will have gravel, impervious clay and random rock zones. The embankment will be 1,920 feet long with maximum height of 335 feet from foundation to crest.

both rock formations also are heavily seamed, they, too, will be grouted.

Abutment excavation has featured the use of conventional equipment in some of the most unconventional places ever seen. For example, some stripping was done by dozers working as a team with one dozer and a Hyster winch anchored on top, and the other dozer practically suspended from the winch line. Even on the downhill push in many places, it was necessary to hold some strain on the winch line, and a direct pull was the only way the pushing dozer had of getting back up.

Suspend Drills

Gardner-Denver Air Trac drills also were used in places like this, with men suspended around the machines on safety lines and hanging by safety belts. There was, of course, a considerable amount of safe down-hole drilling, but the thing which will stand out most vividly in the drillers' memory after the job is finished is the many hours they spent hanging in mid-air.

The six Gardner-Denver Air Tracs have DH-125 guns. They are equipped with Gardner-Denver Series 600 drilling steel and Timken rock bits of 2¾-in. diameter. Bits were sent out for resharpening to a machine shop in Eugene. A few jackhammers are for miscellaneous work.

Compressor equipment to keep this spread busy included a new Gardner-Denver 900-cfm rotary, a 600-cfm Gardner-Denver rotary and a stationary plant with two 1,000-cfm Ingersoll-Rand machines.

Some drilling was done to a depth of

Working along the diverted Wilamette River, Green-Tecon's 4-yd. 88-B begins stripping muck into Euclids from the left abutment.

73 feet along the right abutment because a slippage plane made it necessary to get down to sound material in one pass. On deep drilling, a 7 x 7-ft. grid was used, with the same grid applying to normal 20-ft. deep drilling. On shallow work, where one 10-ft. length of steel would do the job, hole centers were closed up to five feet square. This was done to give better fracturing and prevent the breakout of large boulders.

Average production for the Air Tracs was between 800 and 1,000 linear feet of drilling per shift, with the Timken tungsten-carbide bits giving about eight days of service before they needed resharpening. The rock definitely was not abrasive or hard, and excellent drill performance was recorded.

The holes were loaded with DuPont 40% powder, both granular and gelatin-type, and shot by using Primacord and three delays into slope lines. Primacord MS connectors were used to delay the shots.

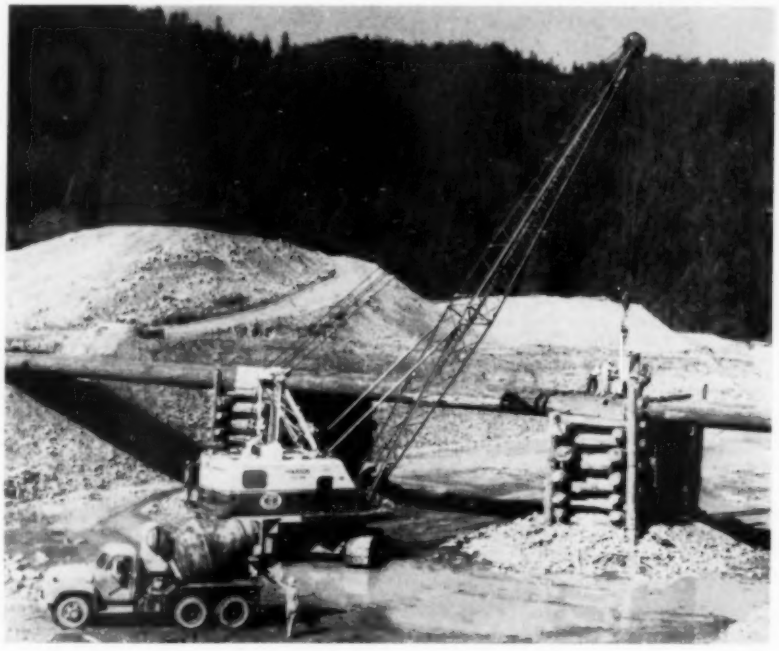
On some of the steep, vertical-walled work, extensive line drilling also was done on 1 and 2-ft. centers to break the rock out perfectly to neat lines.

When photos for this article were taken, the shovel fleet and hauling units were busy over the entire dam site, picking and gouging away at many locations. Work was at a peak on the right abutment, extensive core trench work had been opened up, and the 51-B was continuing its stripping job at the quarry. The 54-B and Manitowoc draglines were loading gravel. The 88-B shovel, when it could break away in the clear, had begun to show what it could do on diversion channel excavation. Working in debris and blasted rock there, it turned out close to 350 Euclid or DW21-Athey loads in a 10-hour shift.

All of this material suitable for dam fill was being taken to the area which had been opened up, where it was dumped and spread. The fill area thus far built consists of a large dike at the upstream toe of the dam, which will also serve as a main diversion cofferdam and remain in place as a part of the main structure.

Overburden, dirt, debris and other waste material clearly identified as such is being hauled into designated waste grounds. No impervious material has been hauled as yet, but a large feeding and screening plant is being erected to separate the 6-in. plus rock out of this clayey material. Sometime after river diversion is done, the impervious embankment will start to go in. Separation

Marion 111-M with Gar-Bro bucket places structural concrete in the log-crib piers of a temporary service bridge. As a dragline, the unit also handles gravel borrow.



At the site where a rip-rap quarry has been opened up, a 2-yd. shovel loads double-spotted International Payhauler trucks.

(Left) Tire subcontractor has separate building for servicing rubber on hauling units. (Right) Warehouse has big parts stock.

will be done in the plant by a Universal wobbler, 48 inches wide, saving the cobbles for a gravel zone in the dam and using the good material to make the impervious core.

Heavy production will of course get under way after the river diversion. At that time the Wilamette will be shunted over into the right abutment tunnel, which will carry it through the dam. An intake channel has largely been dug by the 54-B and Manitowoc as gravel has been excavated from the reservoir area. The concrete batch plant is practically completed, too, so that necessary concrete and riprap work can be finished in the outlet channel prior to diversion.

The preventive maintenance and repair setup on equipment has been based on the fact that all machines will have to carry through in good condition until the dam is finished sometime in 1961. While every effort was made to bring in new equipment, some compromises had to be made. For example, the Euclid fleet saw previous service on the St. Lawrence Seaway job; the 111-M was a used machine; and several of the tractors have seen previous service. The 1601 shovel also was a used machine.

Green-Tecon are well set up for maintenance with a 260-ft. long main shop building. The shop has eight heavy equipment bays. There is a warehouse full of parts, and an excellent trained staff of 21 mechanics, seven welders and numerous oilers and lubrication men is available.

A tire repair and supply contract has been awarded to Rogers Supertread, Inc., of Yakima, Wash. The firm has set up a shop at the job complete with new tires, retread equipment and a complete line of repair equipment. Trained men are on duty constantly to inspect all tires on equipment and to make the necessary repairs or service changes.

Union Oil fuel and lubricant products are being used exclusively with the exception of some D-A grease. The latter is an unusually good product, according to the master mechanic, particularly in track roller service where it's almost indestructible. Engine oil changes are on the basis of 100 service hours.

Build Contraption

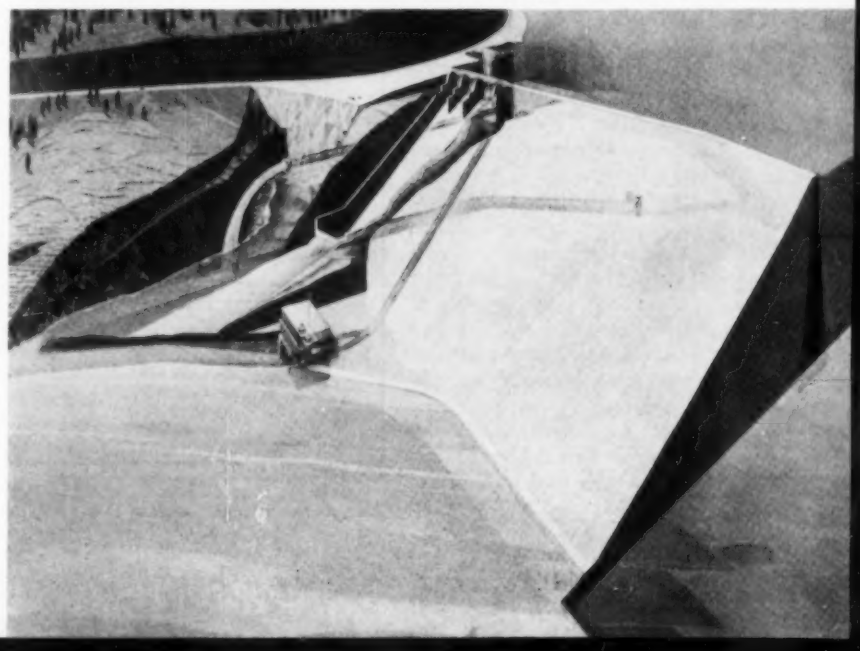
The shop is also called on to make a variety of interesting special equipment. For example, when a damp, rainy spell hit the dam in mid-summer, drilling crews ran into trouble. Stemming material used by the drillers tended to bridge over, slowing down the loading of powder. The head driller went to the shop and asked for some sort of a "Major Hoople" contrivance which would dehydrate sand.

The answer was produced in about a week and consisted of a small three-speed transmission cage which revolves a 10-ft. long drum built exactly like the drum on an asphalt plant. Wet material shoveled into a hopper at the top of the sloping drum has a shake feed caused by a spring-loaded notched plate. The drying fire is furnished by a skid-mounted butane tank operating through a burner at the lower end. The device was expected to be invaluable for rainy weather. Many other special jobs of this type have been turned out.

The size of the shop and the competence of personnel leave little doubt that the equipment will carry through the job in good shape.

Heading up the contractor's organization of supervisory personnel at Hills Creek is Project Manager Chal Beard. His assistants include Joe Wheeler, general superintendent; Howard Flake, equipment superintendent; Bob Smith, project engineer; and Jerry Olson, office manager. Philip L. Cole is resident engineer for the Corps of Engineers.

Here's how Hills Creek Dam will look in 1961. A gated, chute-type spillway and a tunnel outlet will be provided in the right abutment. Capacity will be 30,000 KW.



Mapping a Highway 3,000 Miles Away

Specialist firm in United States plots right-of-way for South American road.

NOWADAYS a highway can be mapped from a vantage point 3,000 miles away.

In quiet Syosset, N. Y., a suburb of New York City on Long Island, the engineering firm of Lockwood, Kessler & Bartlett, Inc., is carefully mapping a road that will join two cities in Colombia. The road will traverse rugged, remote South American mountain terrain still in the pack mule era insofar as direct overland travel is concerned.

Use Photogrammetry

"Long distance highway engineering is really not difficult with modern techniques like photogrammetry and with up-to-date engineering aids like an electronic computer," says George E. MacDonald, vice president and chief engineer of Lockwood, Kessler & Bartlett. "The Ministry of Public Works at Bogota recognized this, too. Seeking to save time and eventual construction costs without sacrificing accuracy or design, the Ministry, in cooperation with the Department of Antioquia, authorized us to go ahead.

"The equipment for the work represents a tremendous investment, and since we cannot duplicate it in South America, we do the work in our home office."

The proposed new road, the latest in a series of Colombian assignments handled by the New York firm, will run southeast from the major industrial center of Medellin to La Dorada, a port city of the Magdalena River. There it will connect with another projected road to Bogota, giving Medellin and its 400,000 people their first direct overland link with the nation's capital.

The countryside is sparsely settled, desolate and virtually unmapped for engineering purposes. Lockwood, Kessler & Bartlett's first task was to create the necessary maps.

Crosses Mountains

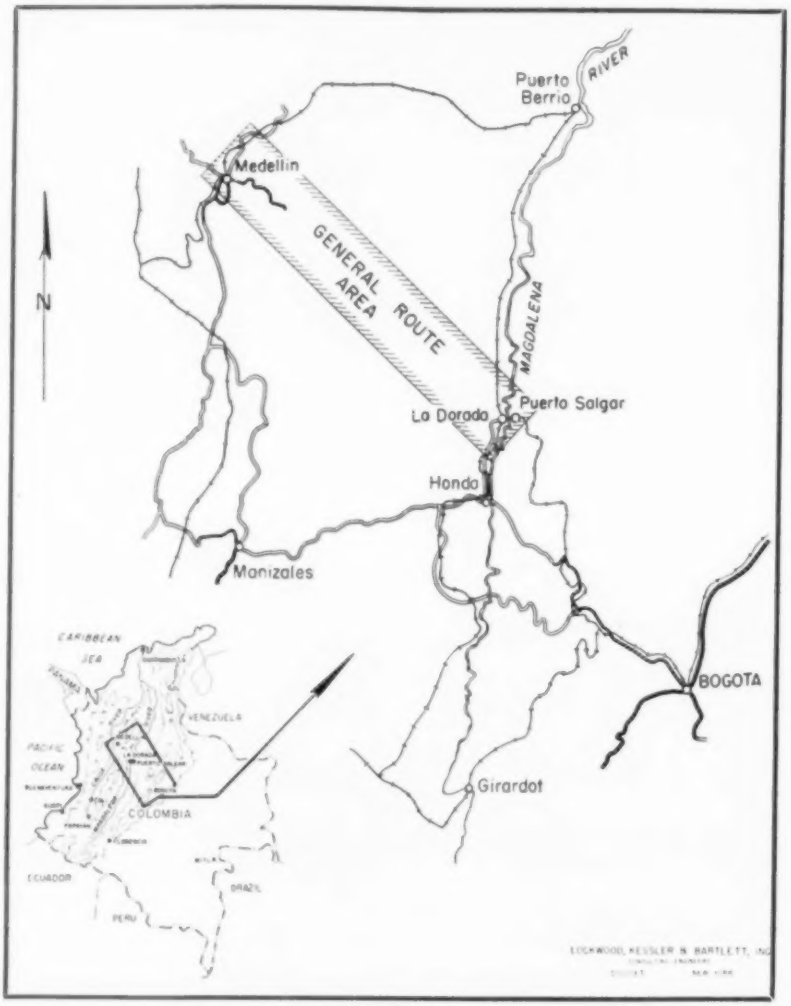
From Medellin, situated 5,000 feet above sea level on the side of Colombia's Central Cordillera (mountain range), it is 90 air miles to La Dorada, at sea level. The road, however, will cover about 125 miles, MacDonald estimates, as it winds its way up and over the central range, then down the other side. Bogota is about the same distance beyond La Dorada. It lies 10,000 feet up in the Eastern Cordillera.

By air the two major cities are an hour or so apart. Existing railroads and highways are extremely circuitous and slow. The lack of a direct land route, MacDonald points out, has helped to isolate Colombia's industrial and political capitals from each other.

The engineering firm never even considered plotting the road by conventional methods.

"From a time standpoint, to send surveying crews into the area was virtually impossible," MacDonald said. "So we flew a photogrammetry crew down to Colombia and did our surveying by air."

Photogrammetry, in which the firm pioneered, is the science of creating contour maps by means of aerial photography. An airplane equipped with a precisely made and carefully calibrated aerial camera flies back and forth over the area the road is to traverse. It takes a series of overlapping photographs,



Here is the area to be traversed by the Medallin-La Dorada road being mapped by New York state engineering firm using aerial photography and electronic equipment.

which are then matched up and overlaid to form an aerial mosaic.

At Syosset, aerial photography experts carefully matched up dozens of pictures and mounted them on a long board. When they were finished, they had a complete, scale view of every hill, valley, stream, nook and crevice in the 90 miles between Medellin and La Dorada.

Also at Syosset are Lockwood, Kessler & Bartlett's stereoplotters. With these instruments, costing up to $52,000 each, skilled technicians actually trace "along the ground" of the photographs and construct precise, accurate topographical maps.

Layout Highway

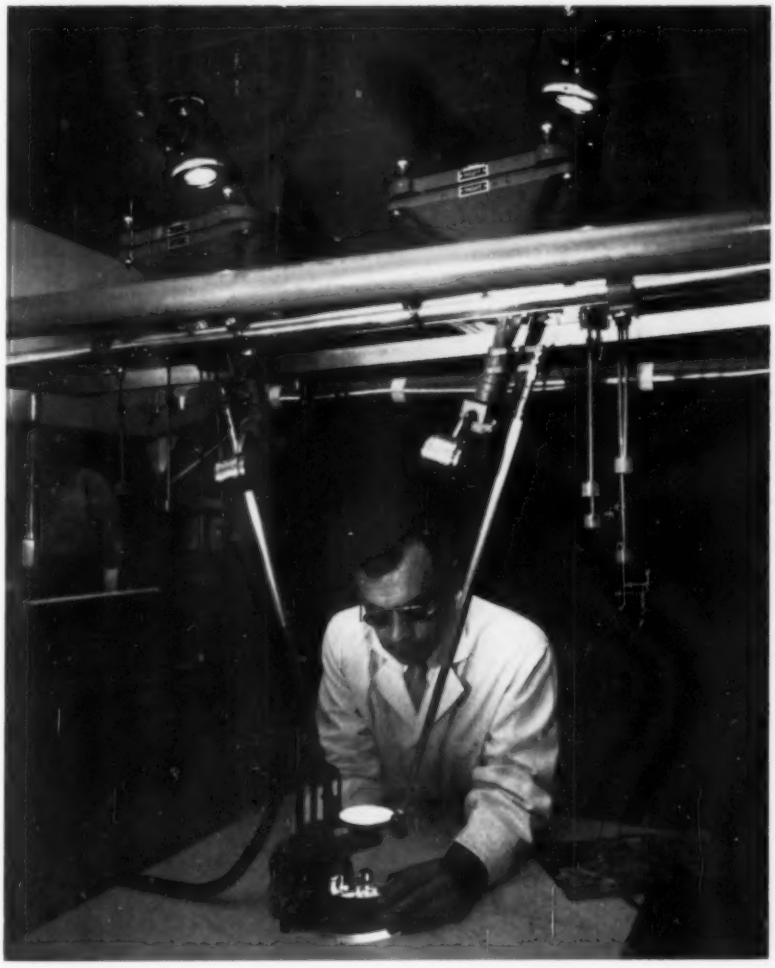
With the photos and maps the engineers can then lay out their highway. They can tell, for example, whether or not to deflect the road a few miles to take advantage of a natural grade or mountain pass, or where it will be most feasible to bridge a stream.

Even more important, they can use one surveying expedition to chart alternate routes. On their maps, the Lockwood, Kessler & Bartlett engineers have already sketched out several possible routes swinging to the north and to the south of Medellin, and they are studying the intricacies of each. Surveying by land would have meant sending crews in both directions, at a tremendous additional expenditure of time.

At the firm's home office there is a digital computer. Worth around $50,000, this electronic unit, adapted to road-building only within the past two years, turns out in minutes answers that formerly took weeks and months to calculate.

The computer is a major factor in keeping construction costs to a minimum, MacDonald said. For example, how much earth will have to be moved if the road follows one path? How much if it follows another? What will it cost to shift a roadbed 100 yards?

"The arithmetic of such problems alone used to be so time-consuming that engineers would attempt to strike a happy medium and let it go at that," MacDonald said. "But there is no need for hit-and-miss methods with our computer, for we can quickly tell exactly what is involved."



A technician operating a stereoplotter constructs a contour map of terrain through which a highway is to pass. Using overlapping aerial photos, the stereoplotter projects a three-dimensional image. The technician is wearing colored 3-D glasses.

Lockwood, Kessler & Bartlett has several other electronic devices at its command for modern road engineering. One is a tellurometer. By means of radar-like signals, this equipment gives the engineers actual ground distances more accurately and much faster than conventional tape measurements.

An airborne profile recorder works on a similar principle. Used in conjunction with the aerial camera, it maps the actual profile of the ground below.

A stereoscopic pair of vertical aerial photographs is studied for route selection with the aid of a mirror stereoscope.

Interstate Route Expressway Joins Hartford—Springfield

Connecticut contractor moves half million yards of earth on federal project. Exceptionally wet season and poor drainage at the site complicate laying and compaction of sub-base.

ARUTE Brothers, Inc., New Britain, Conn., is one of a number of contractors in the New England states who run a fast-moving highway job during eight months of the year and then curtail earthwork during the cold, wet months. In order to beat contract deadlines, these firms must get far out ahead of schedules so they can mark time during the winter season when work is most costly and difficult.

Today, Arute is well advanced on an interstate road job in Connecticut, which it started only last July. The contract is worth $2,761,146 and allows 655 days. The contract section will be ready for traffic in early spring of 1960.

Winter Stoppage

Earth excavation and placement of embankment material are about 90% complete. The contractor is letting the embankments set during the winter months so that this spring they will be firm and ready for laying of the base course and concrete paving. Alternate freezing and thawing will help shrink the fill areas to proper height.

The Arute contract is part of a high-speed, controlled-access interurban expressway between Hartford, Connecticut's capital city, and Springfield, Mass., an important industrial center 27 miles north.

There are a total of six contract sections along Connecticut's share of the mileage. Arute's work is located along the Connecticut River opposite the city of Windsor Locks about 10 miles north of Hartford and begins at a point where a .3-mile long bridge spans the river.

The Hartford-Springfield expressway is being built with interstate highway funds. The federal government is paying 90% of the cost and the remainder is being borne by the states of Connecticut and Massachusetts for the portions of the road within each state's borders.

The expressway will be a segment of projected U. S. interstate route 91 extending northerly from the seacoast at New Haven, Conn., through Hartford and across Massachusetts and Vermont to the Canadian border. Purpose of the new interstate road is to serve as a relocation of outmoded U. S. route 5.

Jumping ahead of the contract schedules did not come about accidentally for the Arute firm as the result of favorable working conditions or some type of unexpected good fortune. In fact, the contractor was hampered by exceptionally heavy rains most of last summer and fall which turned clay soil into greasy, slippery footing and frequently made it almost impossible to move machines.

As the job began last July the weekly earthmoving quantities were low, but these yardages were stepped up

Assisted by D8 dozer through soft spot, an 18-yd. scraper brings in good earth fill. Sub-base is from 6 to 27 inches thick.

Bay City 35-ton truck crane pours footing of overpass structures. Piers are founded on pipe piles. Six-yard Rex mixers deliver concrete from a Blaw-Knox batch plant.

as additional heavy equipment was brought in. Big equipment, and plenty of it for the size of the job, made possible the good showing.

Excavation quantities are well balanced with fill requirements. The contract calls for 500,000 yards of earth excavation and about 90,000 yards of borrow.

The job is 15,650 feet long and the soil is mostly clay mixed with silt. At one end of the job the clay is extremely heavy with some layers of hardpan. At the opposite end of the job the predominant material is fine, silty sand. In between is a mixture of both clay and sand.

Hauling Fleet

A fleet of 10 bottom-dumps, loaded by power shovels, handled the tougher clay excavation. Of these nine were Caterpillars with a capacity of 20 yards. The wagons were model W20's pulled by DW20 four-wheel rubber tire tractors. Also on the job was one Euclid model FDT bottom-dump with a capacity of 13 cubic yards.

Scraper equipment for stripping the sandy areas consisted of three new Euclid S-18 units with a capacity of 21 yards and four Caterpillar DW20- No. 456 scrapers rated at 18 yards. Spreading and pushing equipment included two Cat D9's and six D8's. Two No. 12 motor graders maintained the haul roads.

Dipper capacity to load the bottom-dump fleet was provided by a 3-yd. Bucyrus-Erie 71-B shovel and a 2½-yd. 54-B. The larger model was powered by a torque-converter-equipped General Motors 6-71 diesel engine; the other had a Cat D337 engine. In bringing the big shovels on the job, Arute has followed a trend toward bigger equipment. Excavators as large as three cubic yards are becoming more common on New England roads as the interstate program gathers speed. Wide right-of-ways for the superhighways require huge amounts of excavation, even on jobs which are comparatively short and where cuts and fills are shallow.

When *Excavating Engineer* called on the job last fall, General Superintendent Jimmy Arute was in the midst of stripping his largest earth cut. It was about 500 feet long, 35 feet deep and contained about 250,000 yards.

Complicating the excavating task was the presence of hardpan close to the surface of the cut.

The river valley is one of the few places where Connecticut state geologists have seen hardpan occuring on top of clay, according to Charles Preli, state resident engineer. Usually it's the other way around with soft material excavated down to hardpan. This exceptional type of stratification, according to the highway engineers, is the result of glacial pressures during the Ice Age when masses of ice moving down the valley uplifted the hardpan out of normal position.

The earth and hardpan were efficiently handled by the fleet of 10 bottom-

Earth and hardpan are dug out of 250,000-yd. cut by a 3-yd. shovel which loads 20-yd. DW20 Caterpillar bottom-dumps.

dumps working under the 2½-yd. and 3-yd. shovels. The 20-yd. hauling units generally were filled within two minutes by the shovels. A typical haul of 6,200 feet to the disposal area, dumping and return averaged about 25 minutes to complete.

Biggest yardage moved from the cut in one week using both shovels was 30,000 yards. Unfavorable hauling conditions often cut down production drastically from this maximum.

Spread Borrow

Whenever suitable for use as fill, material taken from earth cuts was spread on the right-of-way by the DW20's and scrapers. The earth was placed in 6 to 12-in. lifts. In most areas it was compacted by the force of heavy equipment traveling over it. The contractor always arranged to haul over the newly laid material. Unsuitable clay and hardpan were wasted in spoil areas.

This winter alternate freezing and thawing will accelerate settlement. When the work season starts again in a few months the embankments will be shaped and dressed. A pair of Buffalo-Springfield tandem rollers will complete the compaction to required densities.

Handling of drainage water is a big problem on this section of the expressway. The low lying river area receives a large amount of runoff water coming down from the flat rolling hills along the river.

The Connecticut River valley soil itself creates drainage problems at many points on the job. A layer of sand and mud covers silt deposits. Water stands on top of the silt layers saturating the uppermost layer.

Hough model HH with 2-yd. bucket brings in concrete blocks used for construction of catch basins. Working as a utility loader, it delivers pipe, sand and gravel to sewer.

One of the first things Arute had to do when he came on the job last summer was to drain swamps and ponds and excavate new channels along sides of the road to take drainage flow off the right-of-way. Some 16,000 feet of reinforced concrete pipe of 15 to 42-in. diameter eventually will be required for drainage along both expressway pavements. More than 1,000 feet of this is 42-in. diameter. A reinforced concrete box culvert with twin boxes, each of which has a cross-section 8 feet by 7 feet 6 inches, is being built. About 2,500 feet of corrugated metal pipe 8 to 36 inches in diameter is being used and 18,000 feet of perforated metal underdrain pipe 8 to 18 inches in diameter will parallel the roadway in its shoulders. The drains are always placed on the deeper (uphill) side of a cut.

A Hough model HH Payloader with 2-yd. clam serves as utility loader. It is used mostly in construction of drainage facilities. The Payloader hauls sand, gravel, pipe and concrete block to trenches where sewer and drain pipes are being loaded and also to the underdrains being laid in the shoulders along the road pavements.

The contract includes six bridges and two interchanges. The latter connect with U. S. route 5 and with ramps leading off and onto the big river bridge. About 6,500 cubic yards of Class A concrete are required. Under structures

Median strip between twin roadways contains a 24-in. sewer. Job includes 16,000 feet of 15 to 42-in. concrete pipe and 18,000 feet of perforated metal underdrain.

(Above) Dressing of the rain-soaked fill and leveling out deep tire ruts keep No. 12 motor grader busy. The soft, wet material provides poor footing for hauling units. (Right) Lima 802 piledriver powered by a steam boiler drives steel cylinder pipe shells at interchange structure. Guild Construction Co. drove 15,000 feet of piles.

some 15,000 feet of cast-in-place concrete piles are being driven. The piles have a corrugated metal pipe shell with a nominal diameter of 12 inches which is filled with concrete. Cobi Helcor type cylinder pile shells, manufactured by the Albert Supply Co., Brooklyn, N. Y., are being used on the job, the first time this type has been used on any of the state's roads. Guild Const. Co., East Providence, R. I., subcontracted the pile installation.

Built to interstate standards, the expressway will have dual pavements separated by a depressed median strip averaging about 40 feet in width. Width of each pavement will be 25 feet with hot asphalt concrete shoulders 8 or 10 feet wide on each side for use as an emergency stopping lane. Main line pavement will be 9-in. thick reinforced concrete. About 26,500 cubic yards will be required for the 3-mile section.

Subbase under the pavement will vary between 6 and 27 inches depending upon the roadway material beneath it.

Shoulder pavement will be a $1\frac{1}{4}$-in. course of hot asphaltic concrete on a $1\frac{1}{4}$-in. concrete binder course placed on a $6\frac{1}{2}$-in. broken stone base.

Arute is supplying his own concrete on the job. A Blaw-Knox plant is located on the right-of-way near the maintenance and office headquarters. The Blaw-Knox batch plant has a capacity of 100 tons of sand and aggregate. The plant is fed by a Bucyrus-Erie 22-B clamshell equipped with $\frac{5}{8}$-yd. bucket. Three Rex 6-yd. transit mixers receive their charges at the plant and then move to the cement bin to take on cement. This storage bin has a capacity of 400 barrels.

Leonard Arute is one of three brothers in the 32-year old firm. He is secretary and brothers Jack and Jimmy are president and general superintendent, respectively.

Paving Plans

Pouring the concrete travel lanes will be handled by a Koehring 34-E dual drum paver. Ford triple-compartment dump-trucks will deliver $1\frac{1}{2}$-yd. batches to the paver for mixing and pouring.

Crane-excavator equipment in addition to the loading shovels consisted of two Bay City 35-ton rubber-mounted mobile cranes used for concrete pouring; a Bucyrus-Erie $1\frac{1}{2}$-yd. 38-B hoe

Big dipper capacity is required on job to keep fleet of 10 bottom-dumps busy. This 2½-yd. rig is companion to a 3-yd. shovel.

and a ¾-yd. 22-B hoe, both used for pipe excavation; a 22-B crane used for pipe laying; and the 22-B clam assigned to the batch plant.

Two Mack 12-yd. LJ's with dump bodies were used for hauling gravel, sand and pipe. There were six Ford pick-ups on the job, all radio controlled.

There are three brothers in the Arute firm. Jimmy is general superintendent Leonard, secretary; and Jack, president. In addition, Jack Arute, Jr., is vice-president.

Currently, Arute has going a $6 million job on an interstate route near Saratoga, N. Y., relocating the present route 9 on the "Northway to Canada." Recently, the 32-year old firm completed a connector between Waterford and Montville linking these two communities with the Connecticut turnpike.

General Superintendent Jimmy Arute is assisted on the Hartford job by his brother Leonard, as excavator superintendent and Phil DiMinno, bridge superintendent. Ed Malcarne is master mechanic and Red Tyler, chief of survey party.

Other contractors on the Connecticut portion of the Hartford-Springfield expressway are Savin Const. Co., Hartford, $2.7 million; Savin Bros., Inc., Hartford, $3.8 million; a joint venture of Enfield Road Const. Corp., Thompsonville, Conn., and E. T. O'Neill & Son Const. Corp., Holyoke, Mass., $3.7 million; and Enfield Road Const. Corp., $1.1 million.

At Windsor Locks, a 1,698-ft. bridge is being built to carry the expressway across the Connecticut River. Its design calls for rolled plate beams supported on reinforced concrete piers. Contractor for the bridge approaches and substructure is a joint venture of M. A. Gammino Const. Co., Providence, R. I., and Brunalli Const. Co., Southington, Conn., whose contract totals $1.5 million. Consolidated Builders, Inc., North Attleboro, Mass., is building the deck and superstructure of the bridge at a cost of $3.4 million.

Colonial Battle

There is a historical sidelight to the job which took place during clearing operations by Arute. When trees were uprooted on one particular hill, the clearing crews found arrowheads and musket balls buried in the felled timber. Personnel had a field day hunting for souvenirs on what once evidently was an Indian-settler battleground back in colonial days.

Another unusual construction incident on the expressway job was the fact that a contractor building the substructure of the Connecticut River bridge walked a piledriving crane out into the middle of the river last winter, when water was low, to drive foundation piles for the concrete bridge piers. Construction engineers for the state had figured the pile work for a floating rig. However, with an unusually big seasonal drop in the water level, the contractor, Brunalli Const. Co., was able to walk a crawler crane out into the several feet of water remaining in the river channel. The river bed, with 25 feet of good gravel, provided an excellent working base.

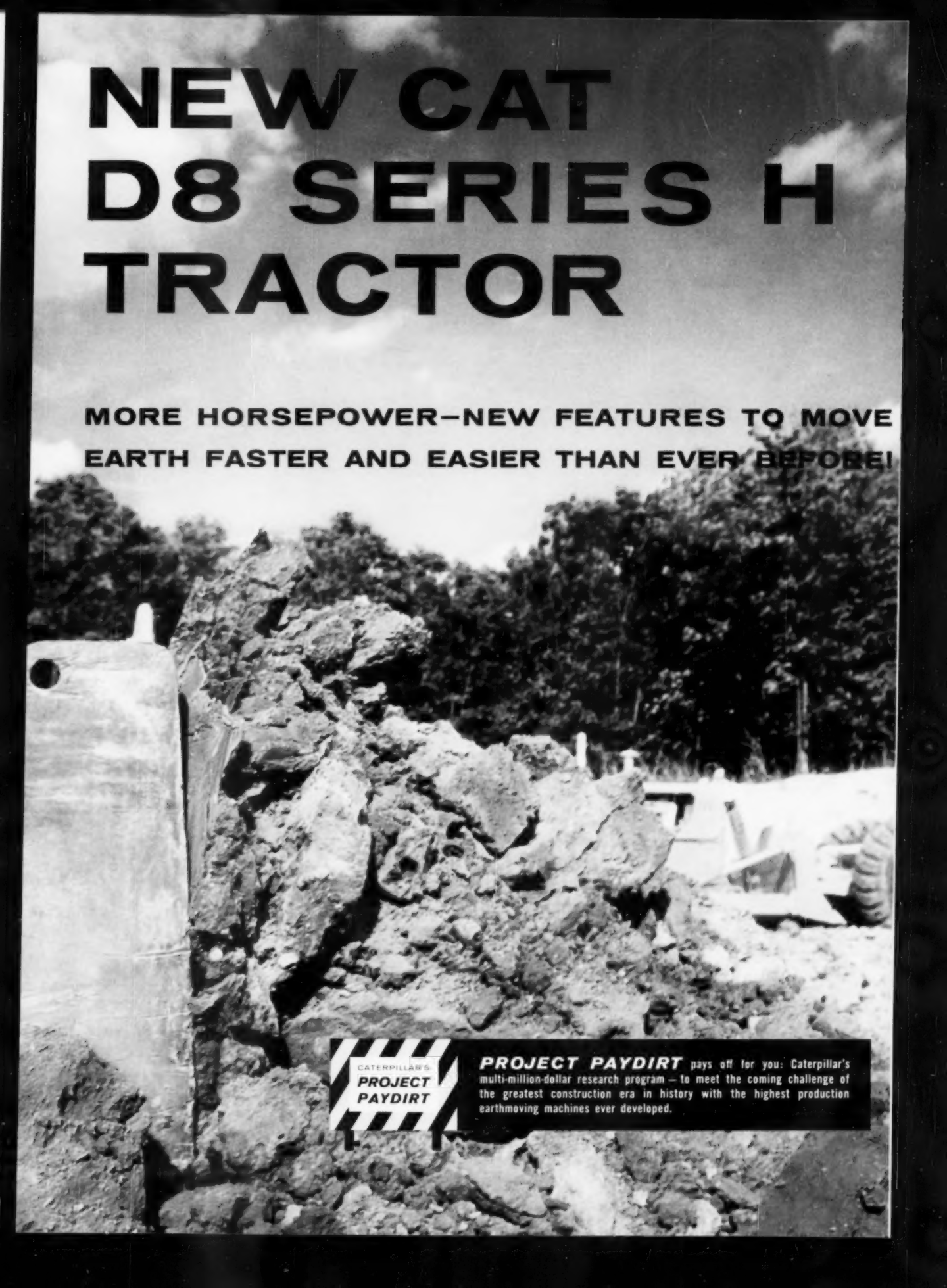
A cofferdam had to be built to protect the pilework and concrete pouring. The cofferdam was allowed to flood overnight. On each following morning the construction area was pumped out and then dewatered continuously during the day.

Roland L. Booth is district engineer for District 1 of Connecticut in which the expressway is located. John Schleiter, Jr., is the division engineer of construction. Newman E. Argraves is state highway commissioner. Connecticut is one of 13 states with highway departments under a single head rather than a board of commissioners. In fact, the four oldest state highway departments in the country—Connecticut, Vermont, Massachusetts, and Pennsylvania—all have single heads.

Brown & Blauvelt, New Haven, prepared the construction plans for the expressway.

NEW CAT D8 SERIES H TRACTOR

MORE HORSEPOWER—NEW FEATURES TO MOVE EARTH FASTER AND EASIER THAN EVER BEFORE!



PROJECT PAYDIRT pays off for you: Caterpillar's multi-million-dollar research program — to meet the coming challenge of the greatest construction era in history with the highest production earthmoving machines ever developed.

BULLDOZING: PRODUCTION UP

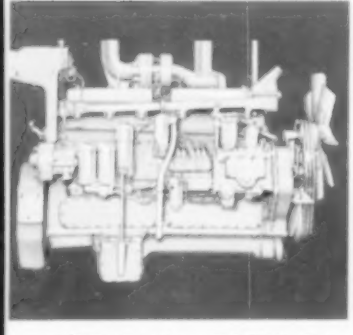
CATERPILLAR'S
PROJECT
PAYDIRT

FIELD TESTS PROVE GREATLY

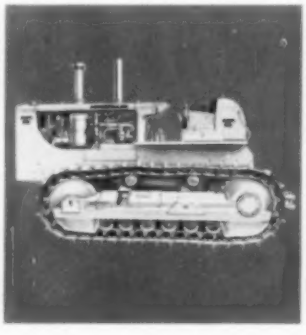
The new Caterpillar D8 Series H Tractor is ready *now* to increase its lead as undisputed king in its size class. A major achievement of Caterpillar's all-out research program, "Project Paydirt," the new D8 has been proved through a rigorous field testing program.

The D8 Series H is new in design, appearance and performance. It is bigger, more powerful. It incorporates dramatic new engineering advances. It is easier to operate. It is faster.

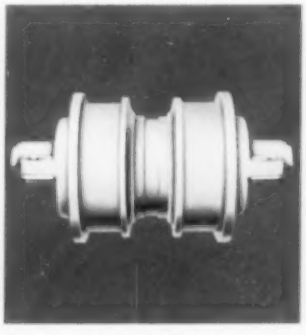
On these pages you can see some of the *big* advances the D8 has made. But there are hundreds of other major improvements, too. For example, the transmission, bevel gear and steering clutches have *one* lube system, and it uses SAE 30 engine oil instead of special



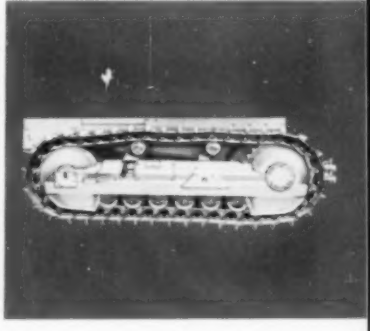
Horsepower increased 18%. The horsepower of the new D8 is up from 191 to 225 at the flywheel, from 155 to 180 at the drawbar. In addition, engine torque rise now is 20%, an increase of one-third. Over-all engine performance has been greatly improved by the addition of a turbocharger.



Size increased. To make effective use of the new horsepower, over-all weight of the tractor has been increased 4,400 lb. to a total of 47,000 lb. At the same time the gauge has been increased to 84 inches, track on ground lengthened to 114 inches, square inches of contact increased to 5,505.



Lifetime lubricated rollers and idlers. That's right – lifetime! In a major research breakthrough, Caterpillar has achieved track and carrier rollers and idlers that never require further lubrication until rebuilding. And service life is hundreds of hours longer than with ordinary rollers.



New, stronger, heavier undercarriage. Every component, such as frames, links, braces, pins, bushings, shoes, has been made stronger by the use of improved materials and heat treat processes to provide longer life. And ground clearance has been increased 50% to almost 20 inches, greatest in the D8 class.

PUSHLOADING: PRODUCTION UP

INCREASED PRODUCTION WITH NEW D8

oils for each. In fact, the D8 is the only tractor in its class to have its entire power train pressure lubricated with completely filtered oil. And there are three brand-new, high-output hydraulic controls for the D8—Nos. 143, 165, 176. The list of improvements is impressive. Add them up, and you can see why the new D8 is the most advanced tractor in its size class.

Now—what can the D8 do for you? Here's the answer:

The Series H (available in direct or torque converter drive, according to your requirements) has been thoroughly field tested. A number of the big new tractors have been at work constantly in every kind of material on every kind of job. The statistics developed during these extensive tests prove conclusively that both bulldozing and pushloading production figures are *up*.

This means that you can move dirt faster and easier than ever before with a tractor in this size class. You get higher production, bigger profit—yet the big new D8 Series H has actually proved *more economical* to own and operate!

But find out for yourself. Get the full story from your Caterpillar Dealer, all the eye-opening facts and figures that can only be touched on briefly here. Then *see* this great new machine at work on your operation as soon as possible! You can't afford not to.

Dry-type air cleaner. Here's still another major Caterpillar research development on the new D8 — the new dry-type cleaner which removes 99.8% of dirt in the intake air, even under severe operating conditions. The new cleaner can be serviced in 5 minutes, costs a good deal less to use.

Superior operation. Operator visibility is excellent because of higher deck and changed seat position. Console-type controls make operator's job easier. And on torque converter models, standard foot-operated decelerator can override hand throttle — free operator's hands for other controls.

TWO MORE IMPORTANT OPERATOR CONVENIENCES

Higher speed. Completely new, long-life, direct drive transmission provides six speeds forward and six reverse. High speed has been increased to 6.3 MPH forward, 6.4 reverse to reduce cycle time. Operator can shift from any forward gear into a similar reverse gear (or vice versa) by simply moving the forward-reverse lever.

Dependable oil clutch. By contractor and operator demands, the virtually service-free, easy-to-operate oil clutch has been retained in the new D8. Another important Caterpillar exclusive.

CATERPILLAR'S
PROJECT
PAYDIRT

Multi-million-dollar research program pays off for you in every piece of Caterpillar equipment

The completely new D8 Series H you have just seen is dramatic proof of the power of Project Paydirt to give you the most modern, productive earthmoving equipment in the world. But this new tractor is just part of a continuing story.

Vast research and development facilities, the most extensive in the industry, bring improvement upon improvement to every piece of Caterpillar equipment. LOWBOWL Scrapers have revolutionized scraper design: the exclusive oil clutch has set new standards of long life.

Whether it's a better way to heat treat a bolt head, the Torsionflex Seat for operator comfort, or redesigning a tractor-scraper combination—nothing has been overlooked to increase the efficiency of Caterpillar machines.

Full Line Helps You Increase Production—Here's the line-up that's waiting at your Caterpillar Dealer to help you to more productive earthmoving.

Track-type Tractors—Besides the new D8, there's a full line of other Cat track-type Tractors ranging from the massive D9 (320 HP) to the smallest—the 63 HP D4. A full range of 'dozers (including the amazing Gyrodozer for D7 Tractors), scrapers and rippers expands the working applications of these tractors.

Traxcavators—The three Cat-built Traxcavators can fill your needs for a front-end loader because they're designed from the ground up for that purpose. Bucket capacities range up to 2¼ cu. yd. All Traxcavators can be equipped with the exclusive Side Dump Bucket, or other special buckets, teeth, 'dozers or forks.

Wheel-type Tractors—Caterpillar wheel-type Tractors feature speed, power, four or two wheel options, plus the exclusive, matching LOWBOWL Scrapers. These rubber tired combinations have an unequalled record for profitable earthmoving production.

Motor Graders—The No. 12 and No. 112 Motor Graders, both available with Preco Automatic Blade Control that maintains blade accuracy of ⅛" in 10', have the versatility to solve construction and maintenance grading problems quickly, efficiently and easily.

Your Caterpillar Dealer is ready *now* to supply the finest equipment for earthmoving. He backs what he sells with dependable parts and service. See him today.

Caterpillar Tractor Co., Peoria, Ill.; San Francisco, Cal., U.S.A.

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EARTHMOVING EQUIPMENT

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Short Sewers Can Be Toughest

Deceptively easy looking Salt Lake job has major headaches for contractor.

by Floyd Suter Bixby

BIG pipe jobs aren't the only ones which cause trouble. Small sewer jobs can sometimes be worse. They, too, run into hard-rock dikes, ground water, quicksand and many of the natural causes of pipeline contractor's headaches. The little jobs should be bid as carefully as the big ones.

Enoch Smith Sons Co., Salt Lake City, Utah, has reached that conclusion after 17 years in business under present management. Spokesmen for the firm even give credit to that conclusion as a factor in company growth. In fact, the company has a job nearing completion right now which illustrates the point.

The project is two miles of sanitary sewer, ranging from 8 to 21 inches in diameter, with 4 and 6-in. laterals. It's located in the Hunter-Granger sewer and water district, covering a new residential section southwest of Salt Lake City. Designed by Templeton & Link of Salt Lake City, the project will carry sewage from the district toward pumping and disposal plants in the city proper. While the depth of ditch is only 8 to 12 feet most of the way, there is practically every ground formation problem in the book.

In one place, where 500 feet of ditch cuts across rock-dike terrain, a very hard lava flow intrudes. The rock is so tightly cemented that only modern excavating equipment has made it possible to move the material without using high explosives adjacent to a school.

In other sections, the ground water table rises close to the surface. There is one area, nearly a quarter of a mile long, where quicksand flows like soup the minute a trench is opened up.

Working with an electronic locator, Supt. Horace Smith moves out ahead of hoe to pinpoint exact location of metal pipe.

Ditching through residential area demands careful probing around intersecting utilities. Enoch Smith firm came up with ingenious ideas to solve many problems.

And, since the entire route is located on the edge of street limits, the number of intersecting gas, water and telephone lines is almost staggering.

Dig Test Holes

H. J. Christensen, general superintendent, approached the tough little job carefully. One of his first moves was to dig test holes through the job. Using a mobile truck-mounted hoe, the job took only one shift, but it gave an excellent picture of underground conditions. At the same time, Christensen practiced good public relations by making friends of the people who lived nearby. When they made inquiries, he explained the job and promised as little inconvenience and interference with traffic as possible.

Digging the test holes made it possible to predict with a fair degree of accuracy what equipment should be assigned. This operation also gave good information for scheduling the rate of progress and delivery of materials.

Mechanized to a high degree, the job is being pushed rapidly. Christensen's

A 2-yd. Hough Payloader equipped with a Superior sideboom is a workhorse on job. It switches around pipe, moves equipment, hauls gravel and loads excess material.

favorite method is to lay the job out in spreads of about 1,000 to 2,000 feet long, and to assign the right equipment to work each spread until it's finished.

While the firm has several bucket-type trenchers, they were impractical for this job because so much of the trench lay in hard digging, and there were so many utility lines which intersected. It was much better suited as a hoe job, so Christensen equipped it accordingly. For the tough sections, two ¾-yd. Bucyrus-Erie 22-B hoes and a ¾-yd. Northwest model 25 were placed on various spreads. A new Schield Bantam was brought in for miscellaneous work, and laterals excavation was assigned to an older truck-mounted Schield Bantam hoe. Two Sherman hoes on Fordson Major D diesel tractors also helped on lateral construction and a third Fordson mounted hoe was rented from a private source to help out.

Auxiliary equipment included a Michigan 125-A tractor shovel for backfill work, a Hough 2-yd. Payloader with a Superior side boom attachment and a total of about 10 pumps ranging from small diaphragm-type machines to large 4-in. centrifugals. Available for locating intersecting pipes promptly and accurately was a Fisher M-Scope, carried in Christensen's car.

Looking casually at the job, it might be easy to conclude that the work was free of problems. It only seemed that way because competent men handled the problems so skillfully. Actually there was considerable tough scheduling and ingenious use of equipment in every spread.

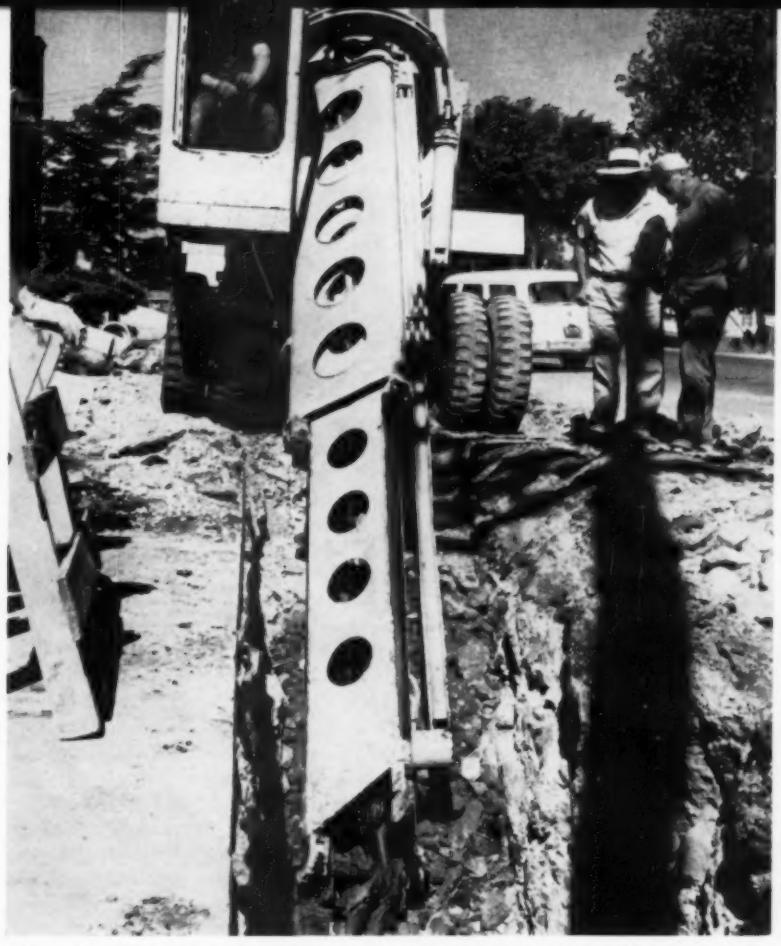
For example, the hard lava rock dike which promised to yield only to compressors, drills and powder was successfully excavated by ripping the formation with double teeth mounted on a rented Warner & Swasey Gradall. Using only these teeth, without a bucket, the machine ripped through a section, then picked up a bucket and made the excavation. The Northwest 25 dipper also was equipped with scarifier teeth on the bottom, so that tough formations could be ripped on the upswing while the machine was digging.

Block Quicksand

Some of the most ingenious pipeline laying work was in sections where quicksand was a problem. Over many years, the contractors around Salt Lake City have found that heavy gravel, dumped in just right, will block off quicksand and hold it while pipe can be laid. Taking advantage of this knowledge, Christensen used his hoes ingeniously.

When quicksand was found, it was usually in the lower portion of the ditch close to grade. At all such points where test holes showed that quicksand could be expected, he had loads of 1½-in. minus gravel dumped at strategic spots. Then, when the ditch was excavated almost to grade, the hoe reached out and set its dipper teeth down on the trench bottom. One of the front-end loaders then dumped a load of gravel in over the bucket, while the operator made the final pass. In this manner the gravel settled out to the side to block off quick-

Truck-mounted Schield Bantam hoe digs narrow trench. Sewers range between 8 and 21 inches, laterals are 4 and 6-in. diameter.



(Above) With digging bucket removed and ripping teeth installed on its hydraulically-operated boom, a Gradall loosens hard lava rock from the bottom of the trench.

(Below) Sidewalk superintendents watch a Sherman hoe mounted on a Fordson tractor cuts a narrow lateral trench. Presence of children required work to be confined.

sand, and the top of the gravel could then be finegraded so that another pipe joint could be laid.

Ingenuity was evident, too, where there was heavy ground water. The way this outfit did the job was to start a section through such places at the low point and work uphill. As the pipe ditch opened up—using the gravel method of blocking off quicksand—a sump was maintained just ahead of the joint being laid. If ground water was exceptionally heavy, a pump of proper size was kept at the heading and was moved, as necessary, by hoes digging the trench.

The side boom on the Hough Payloader also was invaluable in moving pumps.

The main trick was the use of the newly-laid sewer line to conduct ground water down grade to a major sump point, where one or more pumps were installed to remove the water. This kept the work in the dry and kept it moving, too. It isn't uncommon on one of the spreads working under average conditions to see 170 feet laid in 8 hours where there is water or quicksand, and up to 250 feet a shift where conditions are drier and better.

Good Relations

One of the surest ways to alienate the affection of every housewife in a wide radius of one of these jobs is to pay no attention to dust, mud, blocked driveways and other such inconveniences. Christensen never allowed it to happen. He kept these conditions corrected. For one thing, the work was always tightly closed up—often within a 100-ft. distance. The line was backfilled to the end of a joint at the end of each shift. If copper or other bendable water-supply pipes led to private homes, they were reinforced before backfilling by placing support timber underneath.

A Galion motor grader stayed on the job, making a good impression on many people by finishing and reshaping unpaved streets so they drain to the center. Christensen also used sprinkling, and ran water from local irrigation canals on the streets to keep dust down. The motor grader worked only a short distance behind the backfill operation, gathering together excess material, large rock and boulders. It pulled adjacent roadside ditches sometimes and readied the debris for front-end loading into trucks.

According to Christensen, the side-boom mounting on the Payloader has given the firm an exceptionally handy machine. On this job the rig used its 2-yd. bucket for loading excess mate-

After pipe sections are joined, Payloader quickly closes up the trench with scoop.

rial, for backfilling, pump setting and miscellaneous hoisting. Its primary purpose was to unload heavy precast manholes, which had been manufactured in Ogden by W. D. White Co., and trucked to the job. Some of these weighed 2 tons, but the machine handled them successfully.

The company has a central headquarters yard in Salt Lake City, where major repairs to equipment are made. Until just a few years ago, the service and repair procedure was a trial and error proposition, with most of the key superintendents and foremen authorized to make purchases. That has since been changed, with purchasing responsibility controlled by one man. Larger purchases of repair parts and supplies gives the firm better prices, of course, and by issuing the material from a central stock room, a better case history of repair costs can be kept for each machine. There are three mechanics. Two work in the headquarters yard. One is a field mechanic, who visits jobs to make routine adjustments or repairs.

One of the functions of the mechanics and welders has been to build up the hoe dippers to higher-pay sizes. The 22-B rigs, for example, are handling dippers built up to approximately a full cubic yard. Preventive hardfacing, changing of oil filters and replacement of lubricating oil are everyday routine jobs. Engine oil is changed every 100 hours.

The history of the company goes back many years before present management, when Enoch Smith was one of the earliest general contractors around Salt Lake City. Using teams and wagons, he built many of Salt Lake City's streets. A large reinforced-concrete bridge, near the head of Parley's Canyon, stands as a tribute to him. About 17 years ago, on his retirement, his four sons took over. They have handled the company well.

The company specializes in pipeline work, and has done major water and sewer jobs on military bases, housing developments, cities and towns. Last year the company did a large gas transportation pipeline job 88 miles long, and laid some water transmission lines on the United States Bureau of Reclamation's Weber Basin Project. Right now there's another job in the Kearns district—a new town which has sprung up over the old Kearns army base. It has mushroomed now to 17,000 population. A golf course is under way near Draper, in Salt Lake County, and the company bids daily on excavation and pipeline work for gas utility companies in the Salt Lake City vicinity.

When the company finishes a job, according to the engineers who designed this one, it's well constructed, the specifications have been met and sometimes exceeded, and the project has moved along in a spirit of friendliness and harmony. For an engineer to say this on a job so beset with knotty little problems is a tribute to the competence of a firm which operates at the crossroads of the West.

Final cleanup work is handled by Galion motor grader. Dump trucks will carry away any large boulders left behind. Grader also finishes and reshapes unpaved streets.

Tire Checks Lower Downtime at Glen Canyon

Tire service man Ralph Shiffer changes the 14.00-24 front tire on an International Payhauler. Power tools on the truck make largest off-road tires easy to handle.

MILLIONS of tons of rock, aggregate, sandstone and other materials are being moved on rubber tires to help build Glen Canyon Dam, third highest in the world, on the Colorado River near Page, Ariz., in the northcentral part of the state.

Trucks and large off-road equipment move smoothly over the semi-improved roads at the damsite.

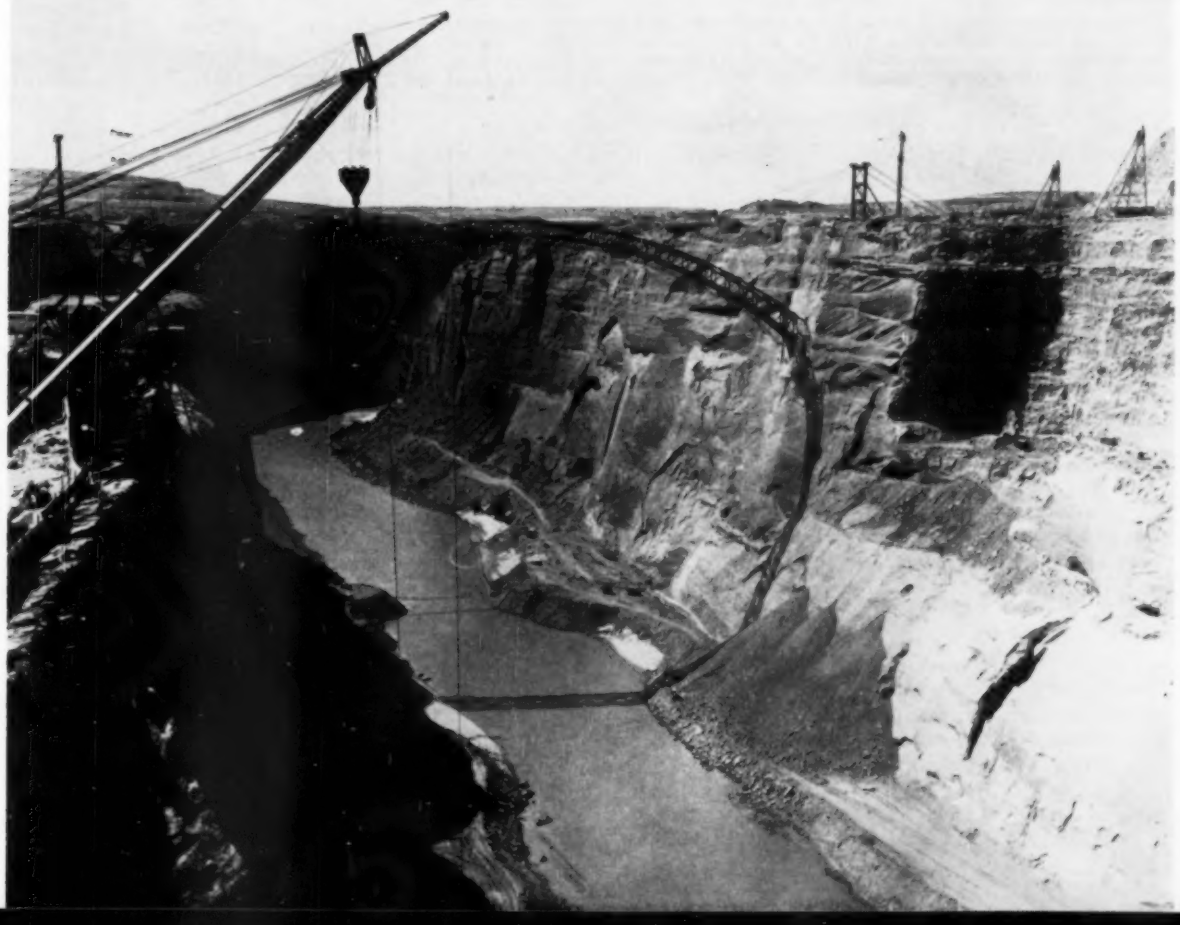
Keeping the project on schedule is a sizeable task in this remote area where rugged terrain and temperature extremes tax the abilities of men and equipment —and where the inaccessibility of normal service facilities could cause endless delay in the completion of this 700-ft. high dam being built for the U. S. Bureau of Reclamation.

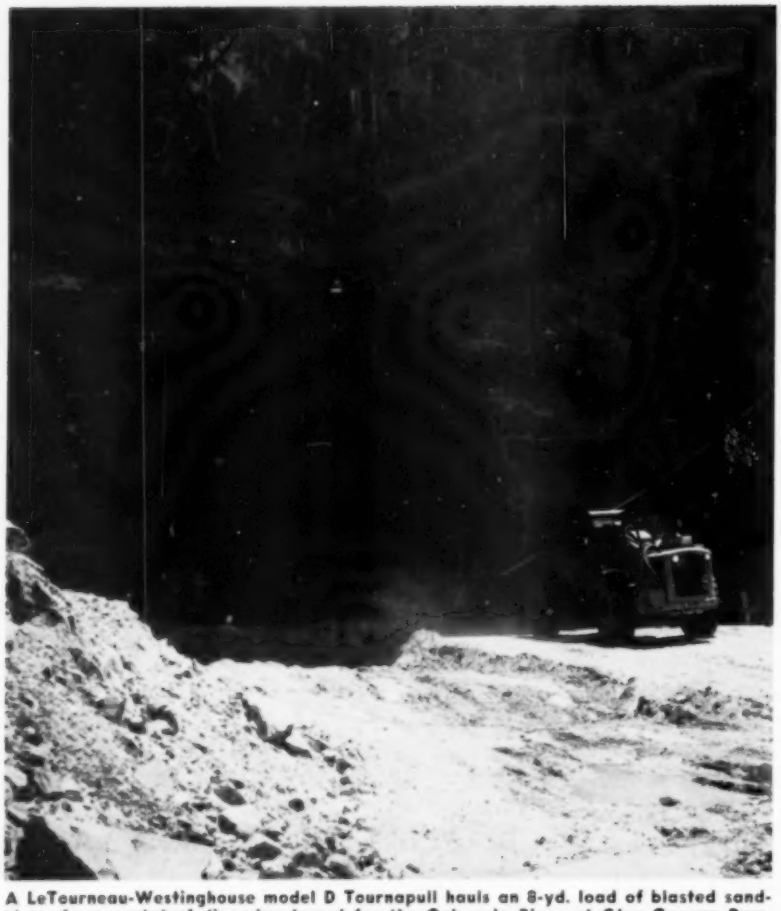
These are some of the reasons why the general contractor, Merritt-Chapman & Scott Corp., New York, N. Y., has established a maintenance program that is more rigid than usual. The purpose is to forestall every chance of costly downtime and to secure the longest possible service from every piece of equipment.

One of the key service programs at the damsite is operated by B. F. Goodrich Tire Co. Vigilance and a daily inspection plan are keeping more than 900 tires working day and night without any delay to the rolling equipment at the project.

Forty-seven different types and sizes of tires, ranging from wheelbarrow size 4.00-8 to 27.00-33 off-road tires weigh-

View of Colorado River looking upstream shows Glen Canyon construction area 13 miles south of the Arizona-Utah state line. Steel arch bridge, 1,028 feet long, will carry U. S. highway 89A. Axis of the dam will be 865 feet upstream from bridge.





A LeTourneau-Westinghouse model D Tournapull hauls an 8-yd. load of blasted sandstone from portal of diversion tunnel for the Colorado River at Glen Canyon Dam. The tunnel is 45 feet wide, 43 feet high and 2,900 feet long. Contractor on the main diversion and access tunnels is Frazier-Davis Construction Co., St. Louis, Mo.

ing nearly a ton, are inspected and serviced every day by the BFG service group. Tires are responding well to the program, giving longer service than expected.

The B. F. Goodrich base of operation at Glen Canyon is a 6,000 square-foot warehouse located near the field office of Merritt-Chapman & Scott. The warehouse is located on property controlled by the Bureau of Reclamation.

G. J. Smith is responsible for the tire facility. Under his direction, three tire servicemen, headed by Foreman Orville Underwood, service the tires on the Glen Canyon project. They inspect all tires at least once a week and examine the tires on all large equipment twice a day. "That is why we never have a surprise tire failure," Smith said. "The inspection schedule we maintain keeps our servicemen so well acquainted with the condition of all tires that they repair or replace worn or damaged tires before they become a source of trouble."

A complete stock of all tire sizes is maintained at the warehouse to serve the contractor and many sub-contractors operating at the project. In addition, a stock of spare tires, mounted on wheels, is ready at a moment's notice for handling emergency calls.

History Charts

"Every tire in service at the Glen Canyon Dam project has its own case history on our record cards," Smith said. "Every month the service records of all tires are reviewed to show the results of our maintenance program. Our reports to the contractor state the reason whenever a tire is removed from service."

Smith said the tire company has recently opened a large new tire retreading plant in Phoenix to handle the retreading requirements at Glen Canyon. The plant there is equipped to serve tire dealers, commercial accounts and industrial firms in Arizona, but the large size molds were installed primarily to give fast tire retreading service to Merritt-Chapman & Scott.

"We work on both sides of the canyon," Smith explained. "We started first on the west side where the warehouse is now located, but when the town of Page and the diversion tunnel were started on the east side, we placed a service truck and a tire service man on that side."

In addition to the truck on the east side and tire service facilities down in the canyon, Goodrich presently operates a contractors service truck and a special servicemobile from the tire warehouse. All of the vehicles are equipped with air compressors and power tools for handling every type of tire service on the job. The large service truck has a hydraulic hoist for handling the huge off-road tires.

Occasionally, the tire service trucks are called to make an emergency trip 30 or 40 miles out on the roads approaching the damsite to assist sub-contractors' trucks having tire trouble. They handle those calls with the dispatch of a big city fire department. "It's all in a day's work here at Glen Canyon," says Foreman Underwood.

Experienced Crew

Tire service man Ralph Shiffer, who has 10 years of service with B. F. Goodrich, and Eldred Cluff live with their families in Page on the east side of the canyon. Their first assignment each morning as they leave home at 7 a.m. is to ride the cable cage 700 feet down into the canyon to inspect the tires on all vehicles working there. Then back to their posts at topside—Cluff to the tire warehouse; Shiffer to operate the service truck across the canyon. Only a suspension foot bridge 1,200 feet long now provides a means of crossing the canyon without descending to the canyon floor. Each tire service man, taking his turn, is on service call 24 hours a day.

There are the 23 different types of equipment operating at the project that need vigilant tire service, including belly-dumps, end-dumps, front-end loaders, motor graders, dozers and tractors, motor cranes, low-bed trailers, transit-mix trucks and pick-up trucks.

Seventeen different types of truck and off-road tires are used on the equipment. Each tire has a different tread design and carcass construction for specific service conditions.

Building Glen Canyon Dam will be a seven-year task. It is the key structure in the Bureau of Reclamation's five-state Colorado River Storage Project authorized by the Congress in 1956.

Ex-Laffs *on the home front-*

by Mann Townsend

"Last chance, Henry! Are you getting up peaceful like — or not?"

"Oh, boy! Time to go to work at last — on my nice quiet air hammer."

"Will you please stop throwing your work shoes in the middle of the floor?"

"It may be big for a lunch box — but I never get pushed around by the crowds on the bus anymore."

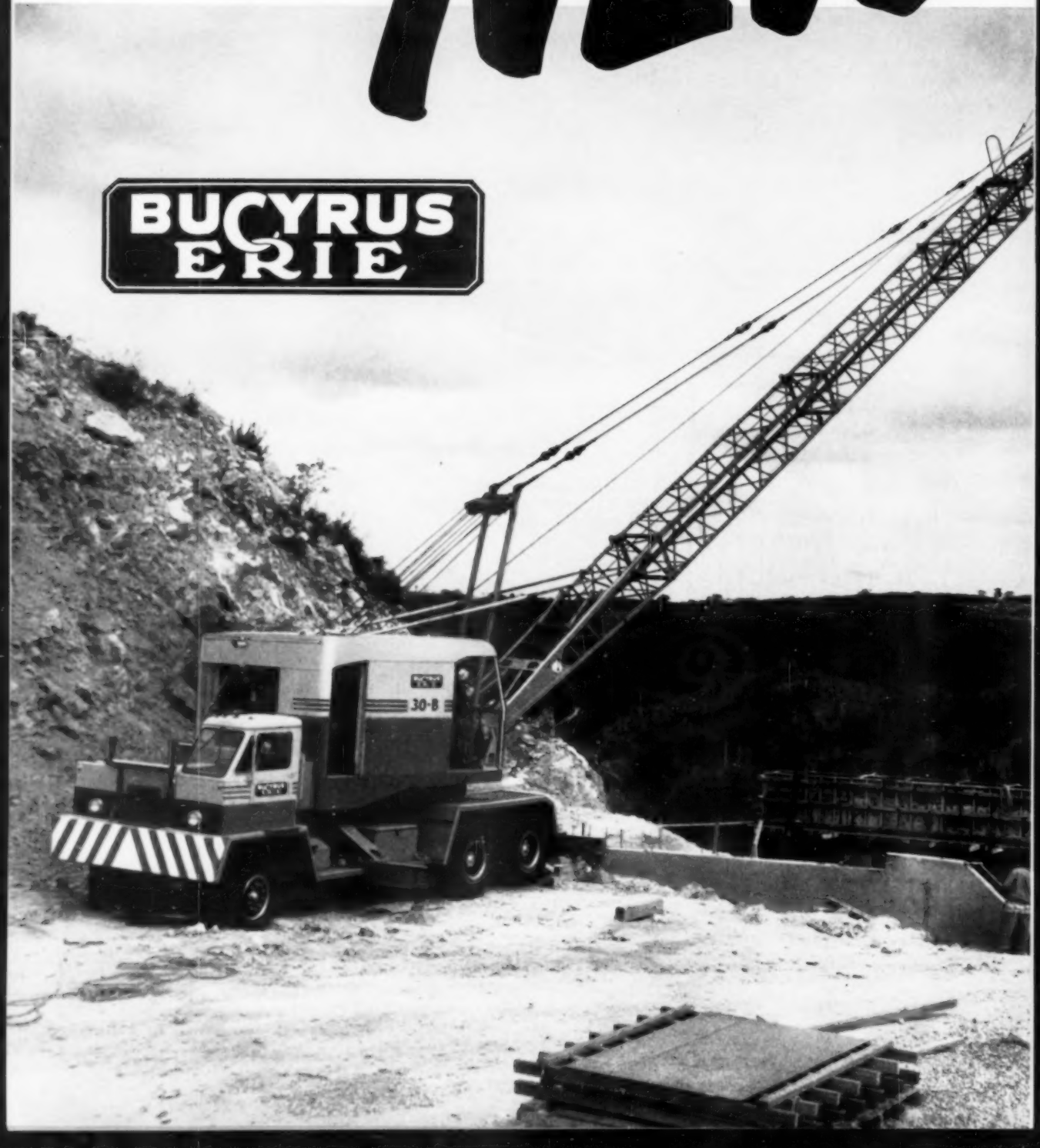
EXCAVATING ENGINEER

"So I told him — double time or not, I'm not going to work tonight and miss Groucho Marx."

"Well, which was it? Did you get a raise or did you get fired?"

NEW

BUCYRUS ERIE



45-TON CAPACITY

30-B transit crane

Here's the big, new Bucyrus-Erie 30-B Transit Crane — designed to give you the *best* lifting crane in its class plus the tops in digging advantages as a 1-yd. hoe, shovel, dragline or clamshell. It's loaded with profit-boosting, cost-cutting improvements:

INCREASED LOAD CAPACITY AT GREATER RADIUS— With a 40-ft. boom, the 45-ton maximum allowable load can be lifted at radius of 15 feet.

NEW BOOM — The crane boom, fabricated of high-strength alloy steel, is designed with heavier chord angles and larger cross sections.

ANTI-FRICTION MOUNTING FOR POINT SHEAVES— Point sheaves are mounted on pre-lubricated, sealed, anti-friction bearings.

AIR-OPERATED BOOM HOIST AND ENGINE MASTER CLUTCH have been added to the 30-B's already convenient, quick-response, air-control system.

ADJUSTABLE CONE ROLLERS provide proper clearance between rollers and roller path. Rollers are also fitted with long-life, heavy-duty bushings to handle the greater roller loads.

BIG, RUGGED, 6 x 4 or 8 x 4 CARRIER, specially designed and built for fully convertible crane-excavator service, is available with gas or diesel engine.

You'll like these NEW features, too!

★ TWO-SPEED GEAR BOX (special)

★ SINGLE-PIECE COUNTERWEIGHT

★ PENDANT SUSPENSION WITH 12-PART TACKLE

★ BOOM ANGLE LIMIT CONTROL (extra)

★ LOWER OVER-ALL HEIGHT

send in coupon

. . . to get the complete story on how the new 30-B Transit Crane adds up to the soundest equipment investment you can make TODAY.

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I'd like more information on the new 30-B Transit Crane.

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News from the Field

"It works something like the big league—it's back to the minors for you!"

ARBA Elects Nello Teer

Nello L. Teer, Jr., president of the Nello L. Teer Co., Durham, N. C., has been elected president of the American Road Builders' Assn. for a one-year term.

Nello L. Teer, Jr.

Election of officers took place in January at the ARBA convention in Dallas, Tex.

Teer, 44, is the youthful head of a highly successful firm in the heavy and highway construction fields. Founded by Nello L. Teer, Sr., in 1909, the Teer company has built more than 8,500 miles of highways. The company is actively engaged in highway construction in the eastern United States, the Republic of Guatemala and the Republic of Nicaragua. It has also been engaged in airfield construction in French Morocco, where it was a joint venturer with the Atlas Contractors in the building of approximately $300 million of airfields for the U. S. Air Force.

Vice presidents re-elected are J. E. McCracken, Bethlehem Steel Co., Bethlehem, Pa., northeastern district; Harold L. Plummer, chairman, Wisconsin state highway commission, Madison, Wis., central district; and W. A. Bugge, director of highways, Washington department of highways, Olympia, Wash., western district.

J. N. Robertson, director of highways for the District of Columbia, will serve as treasurer.

Seven members have been named as directors for terms ending in 1962. They are: E. W. Bauman, National Slag Assn., Washington, D. C.; Kenneth Lindsay, Iowa Mfg. Co., Cedar Rapids, Iowa; William F. Morgan, Blyth & Co., Inc., New York City; O. J. Porter, Porter, Urquhart, McCreary & O'Brien, Newark, N. J.; James W. Spencer, Cornell University, Ithaca, N. Y.; Thomas K. Jordan, Wisconsin state aeronautics commission, Madison, Wis.; and John O. Morton, commissioner, New Hampshire state highway department, Concord, N. H.

Highway Department Gets Statewide Radio System

A new state-wide communication network is being installed for the West Virginia state road commission by General Electric. It is designed with dual-frequency operation so that 10 highway district offices can operate their own two-way radio systems and yet be able to tie back to their state headquarters.

More than 200 G-E mobile radios will be linked with the state system, operating in the 47-mc frequency band.

Fifty-one base stations will be located

Continued on page 52

S. J. Groves & Sons Co., Minneapolis, Minn., uses a special Graco grease rig on its interstate highway 94 contract between Menomonie and Hudson, Wis. The Graco Convoy lubricator, mounted on a Ford F700, services all equipment in the field.

These Special Excavating Jobs Are Best Handled by Sauerman DragScrapers

Deep Digging

900-FT. SPAN— 65 FT. BELOW WATER...

Load is deposited by tensioning the track cable, thus lifting the DragScraper from the pile. Tensioning continues to the desired height for releasing the DragScraper and returning it by gravity to the pit.

Operator controls digging and hauling from cab in head tower.

"the 10-yd. DragScraper is doing a wonderful job and we could not operate without it..."

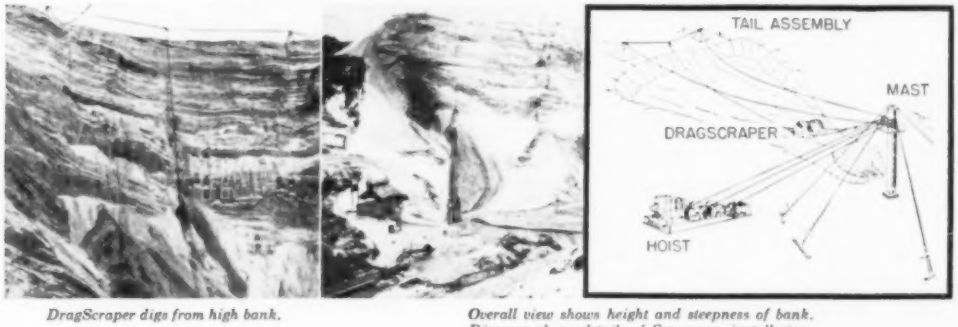
Louis Chinelli, Gen. Supt. Redman Concrete Corp.

Redman had been trucking material at a cost of $35,000 a year to the location where the DragScraper is now placing it. The 10-yd. Sauerman covers a pond area of 1500′ by 3000′ and is digging 40 ft. deeper than their previous dragline could operate.

The DragScraper digs and hauls on a 900-ft. span. It operates between a 90-ft. fixed head tower and a 40-ft. mobile tail tower which may be shifted to change the line of operation. The company's 1000-yd.-per-day batch plants and its fleet of mixers and trucks are kept busy by the steady flow of material supplied by the DragScraper.

High Bank Digging

175 FT. HIGH— 600-FT. HAUL...



DragScraper digs from high bank.

Overall view shows height and steepness of bank. Diagram shows details of Sauerman installation.

"I have nothing but praise for our 4-yd. Sauerman Machine. Since the DragScraper began operations in 1952, we have worked it continuously 12 hours a day..."

John D. Robertson, Gen. Supt. Chandler's Palos Verdes Sand & Gravel Co.

By working down from the top of the 175-ft. bank, the material flows ahead of the DragScraper. This provides bonus loads on each haul and substantially lessens the danger of cave-ins.

Operating cables are powered by a Sauerman three-drum electric hoist. Equipped for rapid shifting, the DragScraper can be quickly positioned to any line of operation between the two tail towers at the top of the bank and the headpost at the hopper.

The plant is the largest sand producer in the South Los Angeles area and, together with two ready-mix plants, keeps 22 ready-mix and 18 dump trucks busy.

The best Sauerman Machine for your plant is governed by the nature of the deposit, location of material, the depth and plant layout. Consult Sauerman engineers about your plant. Their recommendations will be based on fifty years of excavating machinery experience. Ask for Catalog A (DragScrapers). Sauerman News Nos. 149 and 150 describe the above installations in greater detail.

SAUERMAN BROS. INC. 622 SOUTH 28TH AVENUE • BELLWOOD, ILLINOIS

CRESCENT SCRAPERS • SLACKLINE and TAUTLINE CABLEWAYS • DUROLITE BLOCKS

WHICH 3 OF THESE USED EQUIPMENT BUYS IS BEST FOR YOU?

Only your Caterpillar Dealer offers you these three protected buys on used equipment. Which is best? That depends on how you want to use a unit and what you want to pay. Whatever you want, you'll find it in his lot.

BONDED BUY

1 A **"BONDED BUY"** on used Cat-built equipment is your safest buy. A bonded guarantee, up to $10,000, of satisfactory performance on *all* parts is given when you purchase a "Bonded Buy" used Cat-built machine.

2 A **"CERTIFIED BUY"** covers units of any make in good condition. This type of protection carries your dealer's written guarantee of satisfactory performance.

3 A **"BUY AND TRY"** deal is just what its name implies. This protects you with your dealer's written money-back agreement.

You *know* what you're buying from your Caterpillar Dealer. You'll find him listed in the Yellow Pages. Visit his Used Equipment headquarters for the best buys in the market!

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR

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BEST BUYS IN NEW AND USED EQUIPMENT

News . . .

Continued from page 50

throughout the state, providing communications between highway department vehicles, county offices and road commission headquarters at Buckhannon.

Beam antennas, fabricated by the road commission's radio engineering staff, will facilitate the transmission of messages, permitting each district to be covered without undesirable interference to adjacent districts.

Interference will be further reduced by "Channel Guard" tone squelch equipment, designed to prevent control stations in one part of the state from interfering with repeater stations elsewhere in the system.

The radio hook-up is being installed with Civil Defense needs in mind. It will provide a complete state-wide system for CD authorities to operate on a statewide basis.

Moles Honor New York, Idaho Men

James F. Armstrong, New York City, and John B. Bonny, Boise, Idaho, are the 1959 recipients of the awards given annually by The Moles for "outstanding achievement in construction."

The Moles is an association of leading figures in tunneling, dam-building and heavy construction. Howard A. Collins is president. Formal presentation of the honors took place at the Moles' Awards dinner at New York's Waldorf Astoria Hotel January 28.

Armstrong and Bonny make up the 19th pair of honorees in a series that started in 1941 and numbers among its winners former President Herbert Hoover, Robert Moses, Admiral Ben Moreell, Peter Kiewit, Harvey Slocum and Lou Perini.

The award is made annually to one member of the society, and one nonmember. Armstrong is the member winner.

Armstrong is vice president of the Peter F. Connolly Co., and has been in heavy construction more than a half-century, with a great deal of his work being in the field of pneumatic caissons for bridge foundations. In addition to his work with the Connolly firm, he has been associated with the Arthur McMullen Co., Senior & Palmer, Inc., and the Walsh Construction Co. in important bridge installations around the New York metropolitan area. He is a life member of the American Society of Civil Engineers.

Bonny is vice president and general manager of the Morrison-Knudsen Co., Inc., which carries on world-wide operations from its Boise headquarters. Since 1952 he has been virtually "commuting" between this country and French Morocco, Iran and Iraq. In this hemisphere he flies more than 200,000 miles a year in the United States, Canada, Alaska and Mexico, often sitting in as relief pilot in the company DC-3 aircraft assigned to him. During 1958, M-K had more than 200 separate contracts in progress in the United States and 18 foreign countries. Bonny is a University of California graduate, and has been with M-K since 1931.

Harry J. Terker Dies

Harry J. Terker, founder and president of Terry Contracting Co., Inc., Long Island City, N. Y., bridge builders and steel constructors, died in New York City January 4 after a long illness. He was 62.

Mr. Terker's firm built the Third Avenue span across the Harlem River in New York City; a new approach to the Brooklyn Bridge; a new level for the Queensboro Bridge; the Bridgeport harbor bridge of the Connecticut Turnpike; the East Viaduct of the New Jersey Turnpike in Hudson County, N. J.; and a major part of the Anacostia Freeway outside Washington, D. C.

Current New York projects include the route 9 bridge at the Mohawk River north of Albany, and a large prestressed concrete bridge at Oneida Lake outside of Syracuse. Mr. Terker had also built hangars for the military services in Iceland, the Azores and at Presque Isle, Me. During World War II he was active in ship construction.

Mr. Terker began his career in the

"Psst, Miss Hilker, you can come out—my wife's gone now."

Brooklyn iron and steel fabricating business of his father. His specialization as a bridge builder goes back to 1941. Survivors are his widow, Aida; a son, Richard G.; and a daughter, Mrs. Rosalind Dick.

Terry Contracting Co. recently moved into new quarters at 11-11 34th Ave., Long Island City.

Race Against Time At Mammoth Pool Dam

Looking like the Los Angeles Coliseum lighted for a night football game, Southern California Edison Company's "Mammoth Pool" damsite in the High Sierras, 90 miles from Fresno, was a beehive of activity during the chilly mountain nights of the past few months. Hundreds of workmen and scores of vehicles were engaged in an around-the-clock race against time.

Their objective was to dump 450,000 tons of dirt into the huge natural amphitheater before the winter rains.

To permit construction work on the dam, Edison re-routed the river through a temporary diversion tunnel 28 feet in diameter and 2,130 feet long. This tunnel, detouring the river around the damsite, is capable of handling any ordinary flood, even during the rainy season.

However, there is the remote chance of a super "gully washer" which might cause water to spill over and around the diversion tunnel and carry away some of the earthfill dam foundation. Should this happen, many months of work would go down the drain. It is a calculated risk, which must be accepted in a project of this kind.

To reduce this risk to an absolute minimum, the Bechtel Corp., San Francisco, Calif., prime contractor for Edison, placed its work crews on a round-the-clock basis.

If the downstream portion of the dam could be raised another 100 feet before any unusually heavy rains occurred, the chance of damage to work already accomplished would be minimized.

Almost a million dollars worth of earthmoving trucks shuttled ceaselessly back and forth between the damsite and the borrow pit, two and one-half miles away. Huge banks of lights flooding the site gave drivers near daylight visibility.

First step of the dam construction was to excavate the mixture of dirt, sand and rock which had fallen into the gorge

FOR 50 YEARS...
Finest in the Field!
Rely on the bucket contractors rely on. The Omaha Dragline Bucket gives full load with every cast. Perfect balance makes it easy to spot dump. Alloy steel cutting teeth stay sharp, tough and ready. Strike pay dirt now! Complete information and specifications await your letter.
DRAKE-WILLIAMS MOUNT • OMAHA, NEBR.
OMAHA
DRAGLINE BUCKETS

Time-exposure of floodlighted Mammoth Pool dam site shows setup for night hauling. Contractor is racing against winter rains.

ages ago from the towering granite cliffs overhead.

After this stupendous hole was dug down to bed-rock, the next step was to fill it up again—but this time with earth carefully selected from the borrow pit for its consistency and moisture content.

The new fill material used in the core of the dam must be impervious to water, and samples were constantly tested in an Edison laboratory set up near the damsite.

Edison decided on the earthfill construction, rather than concrete, because of the availability of the right kind of soil in the area—which made it possible to realize a significant saving.

Edison is spending roughly $50 million on the Mammoth Pool project, calling for construction of one of the highest earthfill dams in the world, as the newest phase of its vast "Big Creek" hydroelectric project. Water backed up by the dam across the San Joaquin River will be routed to the powerhouse—where electricity will be generated—through a tunnel 20 feet in diameter, blasted through eight miles of solid granite.

The entire project is slated for completion around March 1960.

Excavator Stars in TV Stunt

An excavator figured recently in one of the stunts devised for NBC Television's Truth or Consequences show at Hollywood, Calif.

The man riding in the ⅜-yd. dipper

of a Bucyrus-Erie 11-B Transit Hoe is Ed Banke, of Los Angeles, who incorrectly answered a question asked by Bob Barker, Truth or Consequences' master of ceremonies. Banke's consequence was to sit in the dipper of the truck-mounted machine and use a large spoon to move dirt from one pile to another outside the television studio.

Reports say that Banke required about six hours of work, spread out over several days, to move about one-half cubic foot of dirt—something the 11-B itself could do within seconds. (But why make things easy for a person when he has to pay the consequence?)

The hoe was supplied by the Crook Co., Los Angeles construction equipment distributor. John Brannon, Crook's parts manager, operated the machine for the stunt.

Crook Co., Los Angeles (Calif.) construction equipment dealer, supplied this ⅜-yd. Transit Hoe as the main prop for a stunt staged by *Truth or Consequences* TV show.

Form Road Materials Committee

A national joint cooperative committee has been formed by the National Sand and Gravel Assn., the National Ready-Mixed Concrete Assn., and the Associated General Contractors of America.

Leaders of the three organizations said the joint committee was especially needed because of problems arising from the vast expansion of highway construction under the long-range federal-aid program and the steady increase in the dollar volume of construction activity.

The broad purpose of the CAP-AGC Joint Cooperative Committee is to provide a medium for the discussion of problems affecting members of the three associations and to make recommendations concerning them for the consideration of the parent organizations. The committee, it was explained, will not interfere with the objectives and activities of any of the associations, and its recommendations must be adopted by the parent organizations before they can become effective or be publicized.

Eight members of the committee were appointed to represent the producers of concrete and aggregates, and eight as representatives of the AGC. One member of each group of eight was designated as co-chairman of the committee, and co-secretaries were named also.

Co-secretaries of the committee are Vincent P. Ahearn, Washington, D. C., executive secretary of the National Sand and Gravel Assn. and of the National Ready-Mixed Concrete Assn., and J. M. Sprouse, also of Washington, manager of the Highway Contractors' Division of the AGC.

Predict $72 Billion 1959 Construction Volume

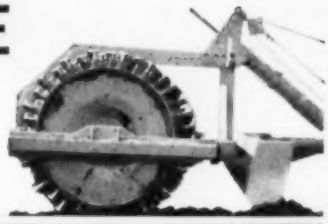
Total construction performed in the United States, after breaking dollar volume records in the face of the general business decline of 1958, stands a good chance of reaching the $72 billion mark in 1959 with a 6% advance, according to the Associated General Contractors of America.

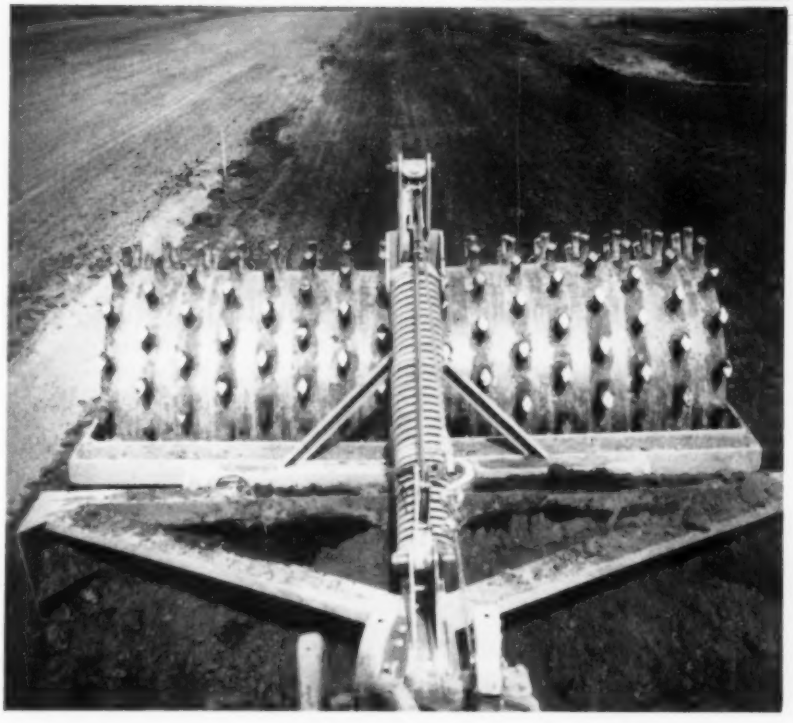
The forecast for 1959 is divided into $52.2 billion in new construction and nearly $20 billion in maintenance and repair. Work put in place during 1958 is estimated at nearly $49 billion in new construction and $18.6 billion in maintenance and repair, for a total in excess of $67.5 billion.

A 16% rise in public construction,

Continued on page 56

LAST YEAR HE WOULDN'T OWN ONE —THIS YEAR HE BOUGHT TWO!





The BROS Leveling Tamping Roller* is such an uncomplicated piece of equipment that last year even big grading contractors like Alley Construction Co., of Faribault, Minn. couldn't quite visualize its real value on earthfill work.

But this year, Lloyd Parker, Alley's superintendent on the grading job for nearly a million yards at Wold-Chamberlain Airport in the Twin Cities, put a BROS G2 Roller-Level Blade combination on the job —the results were so good that he purchased a second unit the *very next day!*

You can easily see why: The Leveling Roller makes subgrade rolling a productive item because it produces uniform, proper densities faster than conventional tamping rollers can. The blade puts the materials into the voids, building a smooth, level course, permitting equal compaction pressure over the full width of the drum. Because the course is smooth and compaction is fast, scrapers can haul and spread at faster speeds, earning you greater profits.

The Leveling Blade has 14" vertical adjustment which is controlled from the operator's seat by either hydraulic or cable control. The Leveling Roller is available in rolling capacities from 15,160 lbs. to 44,700 lbs. when roller drum is filled with wet sand.

*Patent Pending

Level Blade Attachments for your present BROS M2 and G2 Series Tamping Rollers are also available. M2 Blade Specifications: 112" width; 24" height; and ½" x 6" double bevel reversible high carbon steel cutting edge. G2 Blade Specifications: 141" width; 31" height; ⅝" x 8" square edge reversible high carbon steel cutting edge.

Get complete information on this new profit-making equipment from your nearest BROS Dealer or write us. World-wide sales and service.

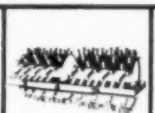
BROS

BROS *Incorporated*

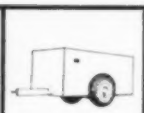
ROAD MACHINERY DIVISION

1057 TENTH AVE. S.E.
MINNEAPOLIS 14, MINN.

Write today for the full report on the Ohio tests and for complete new literature describing the new BROS SP-730 pneumatic roller. It's free of cost or obligation!

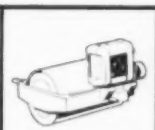


SHEEPSFOOT TAMPERS



ROLL-O-PACTOR

BITUMINOUS CIRCULATOR



VIBRA-PACTOR

9-TON SELF-PROPELLED ROLLER

9 AND 13 TON ROLLERS

News . . .

Continued from page 54

featuring increases in every category of state and local public works, with an accent on highways, will dominate the 1959 construction scene. In the private sector, a moderate advance in residential activity and continued high levels of commercial and public utility construction should more than offset a further slide in industrial building and a slight drop in farm construction.

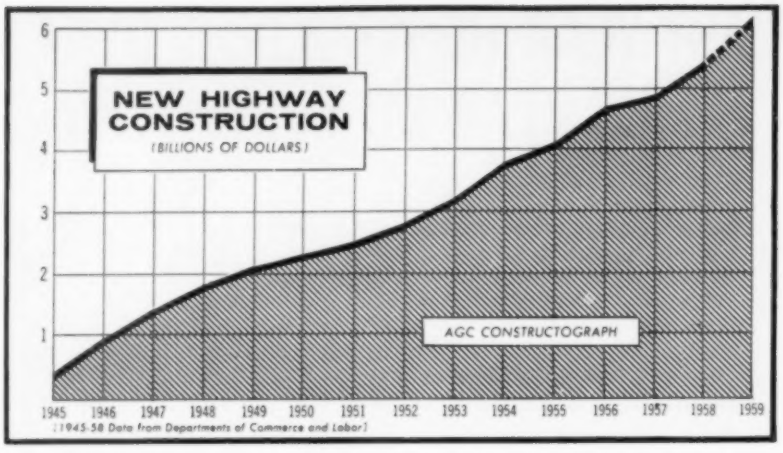
The AGC's annual review and outlook statement estimated that construction of all types in 1958 increased 3% over 1957. It saw increasing contract awards and improving economic conditions as heralding the beginning of a new era of construction growth in 1959.

The AGC, representing more than 7,200 leading construction firms of all types throughout the United States which perform the majority of the nation's contract construction, based its outlook on studies of official governmental figures and information from authoritative private sources.

Basic assumptions are that construction costs will not rise excessively, materials will be plentiful, no prolonged work stoppages will occur in basic industries, and that international complications will not seriously affect economic activity in the United States.

The 6% increase seen for 1959 will be the largest advance in four years, and, if past patterns and long-range forecasts by economists hold true, should signal the start of a new era of construction growth, along with a generally prosperous economy.

The extent to which dollar volume of new construction will exceed $52 billion will hinge much on the volatile residential market, which is heavily influenced by credit policies, and on the extent of recovery of capital expenditures by business.



Highway construction should show a big rise (15%) under the impetus of the federal road program this year, and continue at an increasing rate for three or four years.

The major part of the advance will take place in public construction, increasing 16% to $17.4 billion, with a significant spurt in highways, while private construction should increase 3 to 4% to nearly $35 billion.

While the AGC new construction estimate approximates that of the government, whose forecast was $52.3 billion, it differs within the categories. The AGC projects lower figures for residential and farm construction, and higher estimates for industrial building, highways, public utilities, church and school construction.

Here is the outlook for major construction categories:

Residential construction should show 7% increase to $19.1 billion in private building, and $1 billion in public housing, with upwards of 1,190,000 new units started. How much this rate may be affected by possible Congressional action on housing and credit proposals is a matter of conjecture.

Commercial construction should continue at the peak level of $3.6 billion, with brisk activity in chain stores and shopping centers.

Religious construction may hit the $1 billion mark for the first time in a 15% advance.

Farm construction is expected to decline slightly to $1.5 billion.

Public utilities should hold close to their high levels, and possibly increase slightly to $5.5 billion.

Industrial building should decline at a reduced rate, about 10%, to $2.2 billion, due to fewer projects planned in 1958. A pickup in capital expenditures throughout 1959 will lay the foundation for a rising volume of business construction in 1960.

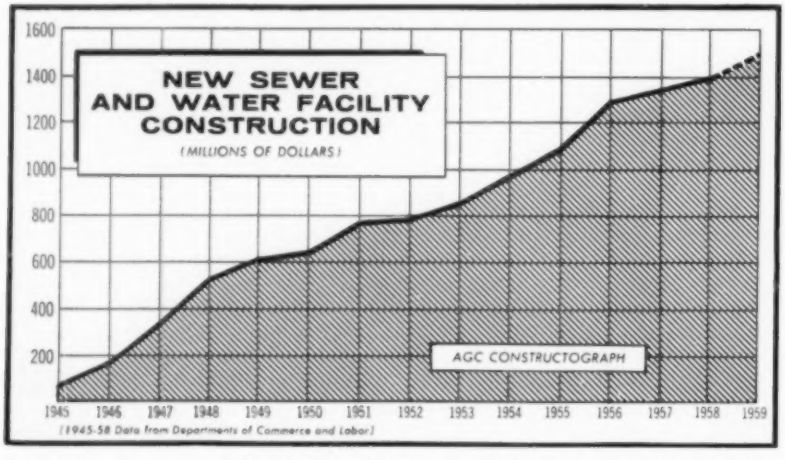
Highways are expected to increase more than 15% under the impetus of the long-range program, reaching $6.2 billion. A continued advance is seen for three or four years.

Public educational building may total $3.1 billion, 8% over 1958, with 74,000 to 75,000 new public school classrooms constructed.

Sewer and water facilities will continue to advance, reaching $1.5 billion.

Military construction, with missile bases in the forefront, may advance from $1.2 billion in 1958 to $1.5 billion.

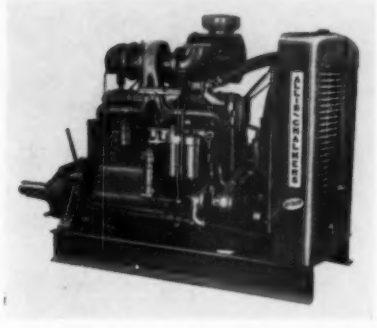
Conservation and development should climb to $1.1 billion, principally from programs administered by the Bureau of Reclamation and the Corps of Engineers.



Construction of sewer and water facilities, while not keeping pace with the needs of expanding urban areas, is on the rise and should increase nearly 10% this year.

Equipment You Ought to Know About

Diesel Engines



Manufacturer: Allis-Chalmers Mfg. Co., Engine-Material Handling Div., Department EE, Milwaukee, Wis.

Claims: Two new heavy-duty diesel engines have been added by the Engine-Material Handling Div. One engine, the 21000, is turbocharged and develops 340 hp at 2,000 rpm. The other is the 16000 naturally aspirated engine developing 230 hp at 2,000 rpm. Both are 6-cylinder, 4-cycle, in-line engines with 5¼-in. bore, 6½-in. stroke, 844-cu. in. displacement and 14.5 to 1 compression ratio.

With the exception of the turbocharger and its related parts used on the 21000, all engine components are interchangeable. Basic weight of the engines is about 3,000 pounds. This gives a weight-to-horsepower ratio of approximately 9 to 1.

Development of the engines has been carried on over a period of more than five years, during which time extensive field tests were conducted.

A feature of the two engines is a new "two-stage controlled turbulence" combustion. The initial "swirl" turbulence is produced on the intake stroke when in-rushing air is directed by positively located masks on twin intake valves. Second stage turbulence, or "squish," builds up as pistons near the top of the

Continued on page 62

NEWS ABOUT THE DUMP BODY BUSINESS

Performance Bonus!

MARION BODIES AND HOISTS

Six Marions Provide Big Daily Payloads On Double-Duty Fill Dirt-Coal Hauling Jobs

Since May, 1958, six Marion 13 cubic yard bodies have been performing double-duty for Frank Murphy Trucking of Zanesville, Ohio. On days when the weather prevented hauling dirt for building an overpass on highway 16 in Newark, Ohio, the units were kept busy hauling coal.

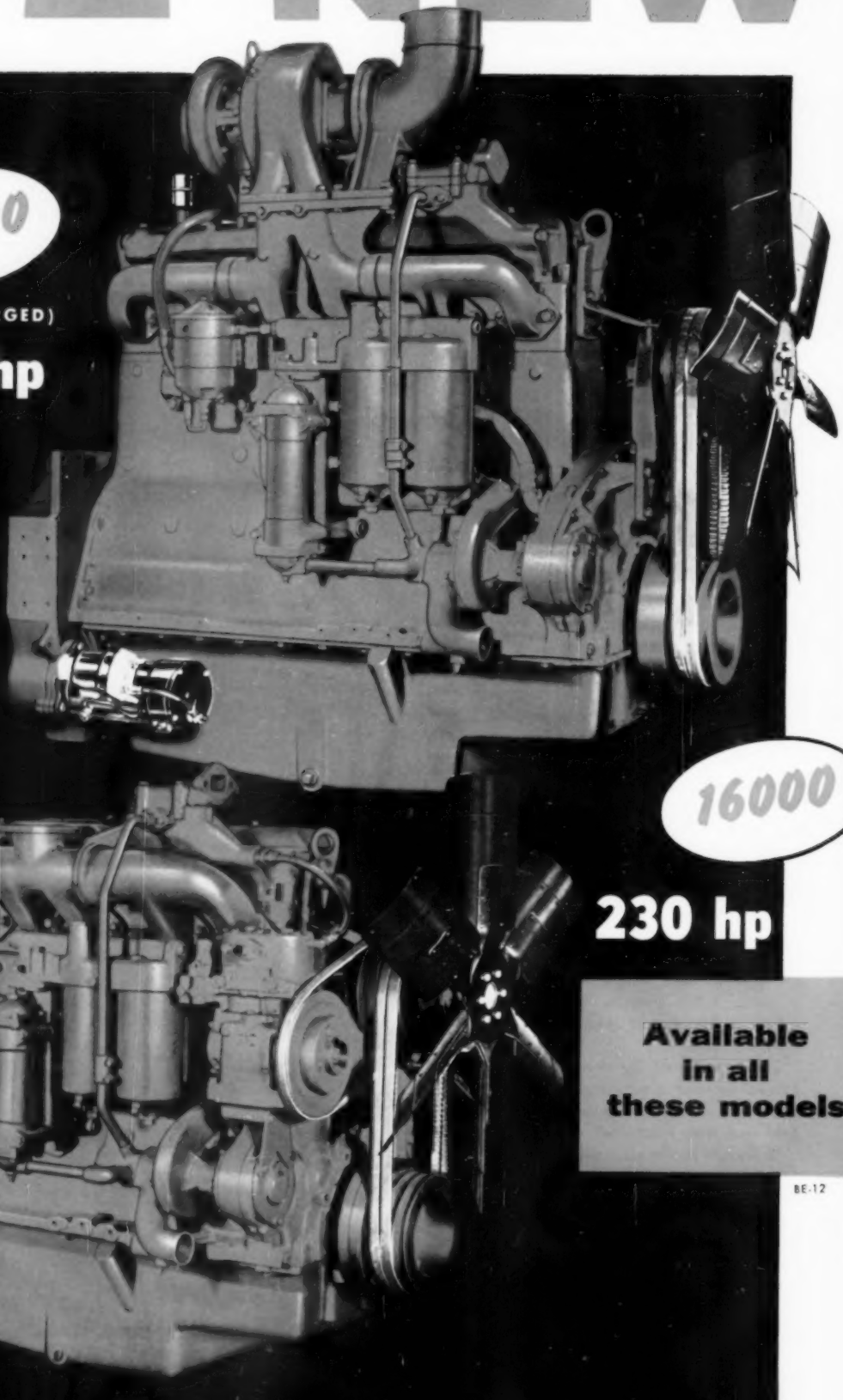
The owner, Frank Murphy, has been well pleased with the continuous operating dependability and efficiency of the units during these nine months. On the road building job, each truck has maintained a high daily payload rate of 450 yards of dirt during each 10-hour shift. Each unit makes 40 to 50 of the 1½-mile round trips a day. The Marions are loaded in 30 to 40 seconds with a grader-conveyor.

The 13 cubic yard bodies are raised with a Marion front telescopic hoist Model LF-614-T-120.

Get all the facts on Marion bodies and hoists for construction . . . quarrying . . . mining . . . all your hauling requirements.

MARION METAL PRODUCTS CO.
Marion, Ohio, U.S.A.

2 NEW



21000

(TURBOCHARGED)

340 hp

6 CYLINDERS

16000

230 hp

Available in all these models

BE-12

DIESELS

that give you

More Horsepower

With 340 hp in the turbocharged 21000 and 230 hp in the 16000, you have the reserve power to operate smoothly and efficiently under extreme load conditions.

More Torque

. . . throughout the operating speed range. Torque is consistently high . . . provides the "umph" to do the job . . . walks into and *through* heavy loads.

Clean Design

Modern engineering means greater dependability, less maintenance, easy installation. To further simplify servicing, there is 98 percent interchangeability of parts between the Allis-Chalmers 16000 and 21000 engines.

Clean Exhaust

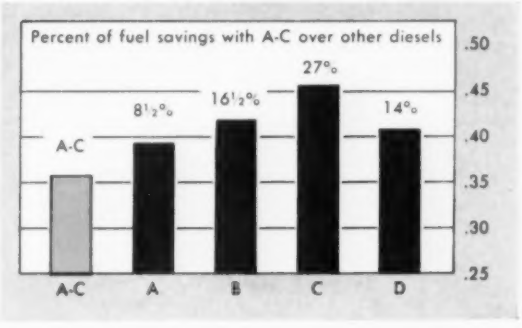
These diesels have a new combustion system* that provides *thorough* mixing of air and fuel for complete combustion. Fuel makes horsepower — not smoke!

*Write for full details on Allis-Chalmers' new combustion system.

Greater Fuel Economy

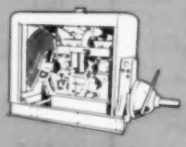
This chart compares fuel economy of the new Allis-Chalmers engines to others in their class. Economy like this gives you from 1 to 2½ hours of extra production a day doing the same kind of work — using even less fuel.

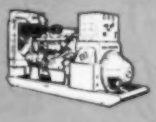
FUEL CONSUMPTION
Pounds per brake hp hr

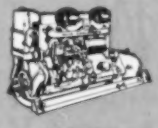


ENGINES

OPEN POWER UNITS


CLOSED POWER UNITS


GENERATING SETS


MARINE DIESELS

TORQUE CONVERTER UNITS

OFF-HIGHWAY VEHICLE ENGINES

Let your Allis-Chalmers dealer show you the many other features that put the *profit* in performance. Write for FREE new 16-page bulletin BU-540. Allis-Chalmers, Milwaukee 1, Wisconsin

ALLIS-CHALMERS

POWER FOR A GROWING WORLD

NOT in the Contract

The TV producer came rolling in one morning at 9 a.m. to face his very angry wife.

"The rehearsals lasted 'til midnight. Then I drove one of the chorus girls home and she asked me in for a night-cap. We had a few drinks and by that time it was so late that she asked me to stay all night. So I did."

"A likely story," said his wife angrily. "You've been out playing poker with the boys again."

Young petite to mother: "You let me go out in rowboats and canoes, surely a yacht is safer."

The professor returned to his class with the examination papers and requested that all the students sit down.

"If you stood up it is conceivable that you might form a circle—in which case I might be arrested for maintaining a dope ring."

Two Hollywood actors sat in a cafe. One requested a loan. "Can I borrow 50 bucks for a week?" he asked.

"Sure," replied the other, counting out the money.

As they rose, the latter said, "Now remember that's only for a week."

"You'll get your lousy money," the first screamed. "Stop hounding me."

The hillbilly was disgusted. The general store was out of his favorite chawing tobacco. "Be sure to telephone me when you get some," he said.

"But, Lem," protested the storekeeper, "you don't have a phone."

"No," said the man from the hills, "but that's no excuse—you have one."

Johnny had just bought a popsicle, when the school bell rang. Stuffing it hurriedly into his pocket, he marched into the classroom. In a few minutes the teacher called on him to answer some questions.

"Johnny," she asked, "What are the people in China called?" "Chinese," answered Johnny. "And Japan?" asked the teacher, "Japanese," answered Johnny. "Now for the last question," the teacher said. "What are the people in Europe called"

This stumped Johnny for a minute. He stammered and mumbled until his neighbor whispered, "European." Johnny flared, "I ain't either. It's the popsicle."

"If you want a raise in pay, Johnson, come to me about it—don't go over my head!"

A young lady from South Carolina was in the hospital for a checkup.

"Have you ever been X-rayed?" asked her doctor.

"No," she replied, "but ah've been ultraviolated."

The harried coach pleaded with the professor who had flunked his prize tackle to give the boy another chance. Finally the professor agreed and did give the boy a special make-up exam.

The next day the coach again anxiously queried the professor. "How did Jones do?"

"I'm sorry," said the professor. "It's hopeless. Look at this . . . $7 \times 5 = 33$."

"But gosh, prof," said the coach, "give him a break. He only missed it by one."

This fellow loved bulldogs. The uglier and meaner the better. The last one he owned was a blue ribbon winner, and meaner and stronger than a middle-sized gorilla.

When he took this dog for a walk, he was literally pulled along the street.

One day this mean ugly bulldog was dragging his "master" down the street when they met a little colored boy who was being followed by a yellow cur-looking "mongrel."

The bulldog leaped to the attack.

Was he ever surprised—his owner, too! With one snap of his jaws, the yellow cur crushed the bulldog's head, leaving him bloody and very dead.

With an oath, the man shouted, "Your mongrel has just killed the meanest and most valuable bulldog in the world! What kind of a dog is he, anyway?"

"I don't rightly know, Mister," said the little colored fellow, "but befo' I cut his tail and painted him yeller, he wuz a alligator."

The doctor told the young lady, "You've either a cold or you're pregnant."

"I must be pregnant," decided the patient. "I don't know anybody who could have given me a cold.

A Texas oil man was visiting New York. His city friend showed him all the sights including the Empire State building.

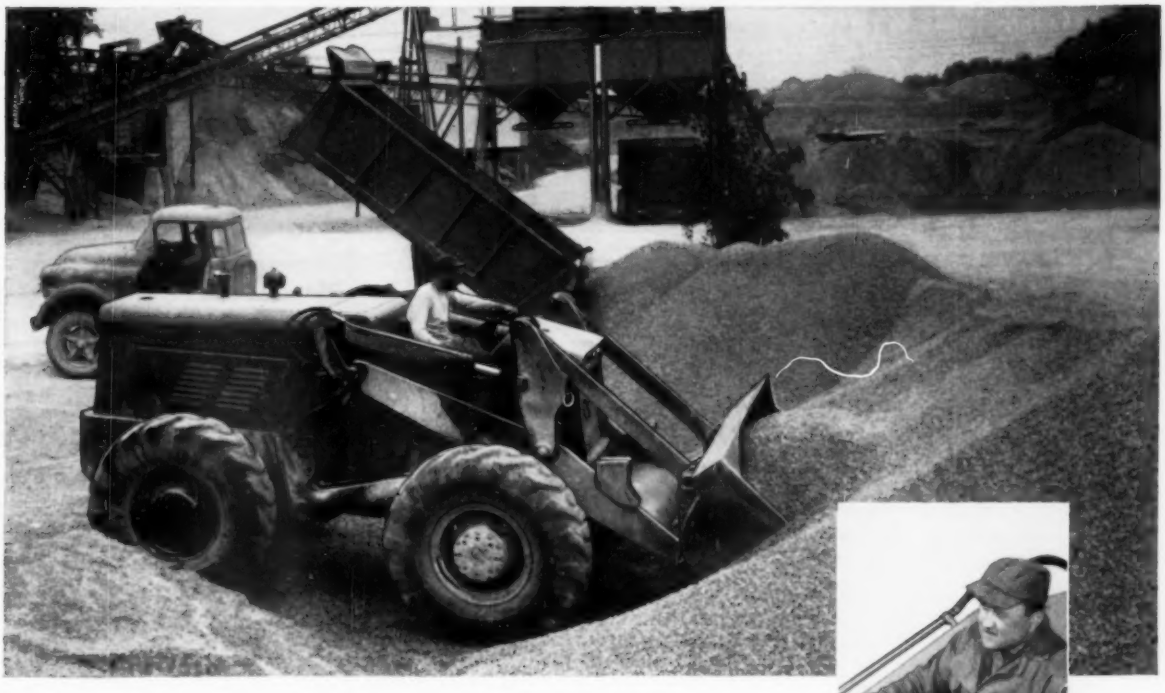
"Isn't that a magnificent structure?" asked his friend.

"Nothing," said the Texan. "I got an outhouse bigger'n that!"

The New Yorker looked him over.

"You need it!" he retorted.

Ask your Allis-Chalmers dealer to show you **"...And a Great Deal More"**



SINGLE-LEVER speed and direction control makes it easy for operator to work fast

If a loader operator has to move one lever for forward and reverse, and another lever to get into a higher working gear, chances are he's going to stay in low gear.

Recognizing these limitations on your achieving faster loading, Tractomotive developed Single-Lever speed and direction control to speed up the work cycle. It's on both the big TL-20 TRACTOLOADER*, and the slightly smaller TL-16.

With Single-Lever control, the operator will naturally choose his fastest possible working gear every time he shifts. He can go into second gear just as easily as first—and get there on the double. Moreover, when there's loading to be done down the road or across the pit, he power-shifts right into high (road speed), and does the job in a hurry.

Let your Allis-Chalmers dealer show you how this exclusive One-Lever control of speed and direction alone will add many extra yards to your daily production.

Other TL-20 and TL-16 working advantages include: Longer Reach; Strong, Pin-Connected Planetary Axles; Extra Stability; Safe Dump Cylinder Location; Extra Hydraulic Protection; Hydraulic Torque Converter Drive; Tip-Back Bucket; "Hi-Traction" Differentials; Power Steering; Ignition Key-Type Starting; 4-Wheel Power Brakes; 6-Way Adjustable Seat; Rear-Axle Disconnect; Bucket Position Indicator.

*TRACTOLOADER is a registered Tractomotive trademark.

ALL TRACTOMOTIVE EQUIPMENT IS SOLD AND SERVICED BY YOUR ALLIS-CHALMERS DEALER

TRACTO—
a sure sign
of modern design

TRACTOMOTIVE
TRACTOMOTIVE CORPORATION, EXPORT DEPT., DEERFIELD, ILL., U.S.A.

TRACTOLOADERS • TRACTOSHOVELS • TRACTORIPPERS • TRACTOHOES • TRACTOSIDEBOOMS

New Equipment . . .

Continued from page 57

compression stroke. The combustion chamber is a cavity in the piston head surrounded by a broad flat shoulder above which air is trapped and squeezed towards the center and given a rotating motion. This is "squish." At this instance of peak turbulence, a multi-jet fog of diesel fuel is injected at high pressure downward into the vortex of superhot, swirling, rotating air—burning the fuel completely. All this adds up to quick, easy starting, even in cold weather; fast acceleration; a clear exhaust throughout the speed and power range; and especially low consumption over a wide range of loads and speeds.

Simplicity, ruggedness and ease of servicing are some of the structural design features of the new engines. The block has internal ribbing to carry stud tension through its entire depth. There is a fully counter-balanced crankshaft with vibration dampener. Aluminum steel-backed precision bearings, with high heat conductivity and load carrying ability, are used. Five-ring aluminum pistons are used with a Ni-Resist insert cast into the piston. The cast iron cylinder sleeves have a flame guard at the top, which guards against compression and water leaks.

Both the 21000 and 16000 have full pressure lubrication. The injection pump is base-mounted with an integral variable-speed governor. A gear-type transfer pump, a two-stage fuel filter and full-flow lubricating oil filters are used.

Allis-Chalmers HD-21 crawler tractors now come off the production line powered by the new 21000 engine, while the naturally aspirated 16000 is now the power plant for the HD-16 crawler tractor and TS-260 motor scraper.

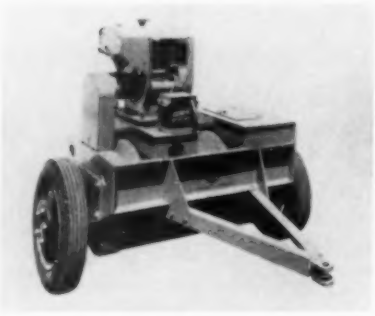
The 16000 and 21000 engines are also available as 130-kw to 200-kw standby generator sets, and for marine purposes, off-highway vehicles, power units and for other heavy-duty service requirements.

Riding Attachment for Vibrating Rollers

Manufacturer: Essick Mfg. Co., Department EE, 1950 Santa Fe Ave., Los Angeles 21, Calif.

Claims: A new riding attachment for the Essick VR-28W roller converts the high-frequency self-propelled vibrating roller into a ridable unit. Design permits quick attachment or removal.

Sturdily built with a frame of formed



steel angles and tubing, the unit features a wetting pad and scraper bar on its roll wheel, a sprinkler tank, and a 16x24-in. operator's platform. All controls are conveniently positioned for the operator.

The riding unit is lightweight and easily attached by one man, and requires no wrenches or tools to connect or disconnect. Attachment is quickly made by releasing two heavy-duty spring-loaded pins which are a part of the adapter frame that is permanently mounted to the roller. The kit is designed to be used with all model VR-28W rollers. There are no loose parts to complicate attachment and it provides a convenient, efficient accessory.

200-Ton Detachable Unit Trailer

Manufacturer: Rogers Brothers Corp., Department EE, Albion, Pa.

Claims: Rogers Brothers has designed and built an unusual trailer for Hoffman Trucks, Inc., Belleville, N. J., a large heavy-moving firm. Its tremendous size is indicated in contrast with a Rogers 25-ton TVT (Top Value Trailer) model.

Conservatively rated at 200 tons, it mounts forty 12 x 24-14-ply tires on axles which oscillate lengthwise and crosswise to equally distribute the load. The unit's front gooseneck rides on a dolly to increase the number of tires, improve maneuverability and absorb part of the load on the tractor. The trailer can be hauled with or without the dolly.

A self-powered hydraulic mechanism will raise or lower the deck for greater roadway or overhead clearance as required.

The unit at the rear supplies power for steering in addition to its use on the deck height and gooseneck removal.

The detachable rear assembly consists of two 8-tire double-oscillating units with two removable 4-tire units attached to the walking beam. This places a total of 24 tires under the rear of the trailer.

The detachable axles are caster-mounted to track with the trailer in forward movement. Power steering is applied to the caster axle for sharp turns or for steering in a reverse direction.

The detachable assembly and the front dolly may be removed for standard semi operation.

To meet length limitations and permit faster return trips, a "stub" connector is substituted for the regular deck which is carried on the goosenecks. This shortens the overall length approximately 30 feet.

Multipurpose Bottom-Dump

Manufacturer: Transport Trailer & Equip. Co., Inc., Department EE, 3400 Sixth Ave., Seattle, Wash.

Claims: A new type bottom-dump trailer is designed for road builders, state highway departments and dump truck operators for handling ballast, sand, gravel or aggregate.

The Converto bottom-dump will handle full width spreading, windrow spreading and filling, as well as special purpose transportation such as bulk cement hauling.

Normal capacity of the trailer is 10 yards. It has a removable bottom hopper held in place by four toggle-type

locks. Air lines which actuate gates are connected to the main frame by conventional truck-type gladhands. In a matter of minutes, a bottom hopper

with single transverse full-width spreader gate may be interchanged with a double clamshell longitudinal gate for windrow spreading or fill work. Also available is a hopper and gate that can be used for cement transportation.

Gates are opened and closed through air-cylinders. The right support member of the tubular frame provides nearly two cubic feet of air storage for the gate system, which is entirely separate from the trailer's air-brake system.

Inner skin of the hopper is smooth. The lower hopper is slightly larger than the bottom of the upper hopper, thus providing a shelf that helps break up materials that might otherwise cause bridging during spreading. In actual operation the trailer spreads 10 yards of cement-treated ballast in 200 feet, without use of air vibrators.

The Converto bottom-dump is designed for on and off-highway operation. It is approximately 5,000 pounds lighter than conventional single-purpose bottom-dumps.

Hough Loader

Manufacturer: Frank G. Hough Co., Department EE, 708 Seventh Ave., Libertyville, Ill.

Claims: Hough's new H-30R Payloader replaces the rear-wheel-drive, front-wheel-steer model HF. The old HF model has been used for many years on governmental and contractor applications.

TRIAL SAMPLES

Of World-Famous WHITMORE'S Lubricants NOW IN AEROSOL SPRAY-ON CANS!

HANDI-LUBE LIQUID GEAR COMPOSITION

For open gears, sliding surfaces—exclusive formulas eliminate metal to metal contact, keep wear on the lubricant not the metal—no breakdown even after prolonged use under water—available for every climatic condition—packaged in handy 16-oz. aerosol spray-on containers or in bulk containers—send for a free trial sample.

WIRE ROPE SPRAY LUBRICANT

Exclusive formulas for lubricating and protecting wire rope, chain, springs. Penetrates to the core of wire rope minimizing internal friction and increasing usable life up to 300%—special protective qualities absolutely eliminate corrosion—non-gumming qualities reduce "carry-back"—packaged in handy 16 oz. aerosol spray-on containers or in bulk containers—send for a free trial sample.

65 YEARS OF LEADERSHIP LUBRICATING THE FOLLOWING:

- Open Gears, Dipper Sticks, Cams
- Enclosed Gear Cases
- Wire Rope and Cable
- Hydraulic Units, Torque Converters
- Roller, Ball, and Sleeve Bearings
- Speed Reducers

Est. 1893

THE WHITMORE MANUFACTURING CO.

LUBRICATING ENGINEERS

CLEVELAND 4, OHIO, U.S.A. PHONE: VULCAN 3-7272

The H-30R has a carry capacity of 3,000 pounds at average operating speeds and is also a rear-wheel-drive, front-wheel-steer machine. Buckets from ¾ to 2 yards are offered for the handling of various materials within the rated capacity.

The bucket action of the new H-30R provides a full 40° of tipback, enabling the operator to obtain larger loads than was possible with the old HF model.

The H-30R Payloader has a new torque-converter with a 2.6 to 1 stall ratio and a four-speed, full-reversing, manually-shifted transmission. It is powered by a six-cylinder Hercules gasoline engine developing 66.5 hp at 2,200 rpm.

Among the numerous attachments available are a ram sweeper; Wain-Roy rear-mounted backhoe; a new ram leaf loader; backfiller blade; lift fork; crane hook; and rotary, V-blade or reversible-blade snow plows.

Versatile Truck

Manufacturer: South Bend Div., Department EE, Curtiss-Wright Corp., South Bend, Ind.

Claims: A unique new on-and-off highway vehicle, combining the best features of a light truck, tractor and prime power source in one vehicle, is available from Curtiss-Wright. The all-purpose unit is called the Unimog.

A development of Daimler-Benz, A. G., of West Germany, the Mercedes-Benz Unimog is being marketed in the United States by Curtiss-Wright. The firm anticipates an extensive market for the Unimog throughout the United States and Canada in construction, utilities, mining and forestry, agriculture, industrial, municipal and military uses.

The vehicle comes in three basic models, with payload ratings 1, 1½ and 2

Continued on page 66

These three working pictures show TD-24's on the J. W. Briggs Construction Co. job — where the contractor is building 10.5 miles of new road to make way for Cougar Dam, under construction. The scenes are on a section being carved from basalt cliffs — where TD-24 operating safety and capacity *equals* the daily yardage of *two* king-sized clutch-steered crawlers!

ONLY PLANET POWERED "24's"

give operators confidence

ON DANGEROUS DOZING LIKE THIS!

As Operator J. D. Steelman (on U-dozer rig) puts it: "The TD-24 gives a feeling of security that sure helps when you are balancing on the narrow ledge of a sheer cliff, 300 feet above the river. The TD-24's steering system, plus excellent vision, good brakes, and all the power you need give confidence that results in high work output—even in the most dangerous conditions.

"TD-24's can push full blades, full time, and can steer without dropping their load."

With Planet Power steering (controlled with 2-finger ease) come multiple safety features that build production-boosting operator confidence. Decelerate instantly with the left foot...apply equal positive braking to both tracks with the single right foot pedal...or, pull back both planetary steering levers with one hand to provide a second braking system, hydraulically actuated. Also, Control Tower Vision lets you see ahead to avoid danger zones.

It takes two king-sized clutch-steered crawlers to equal one Planet Power-steered International TD-24—on this rough, tough mountain road-building job!

Planet Power steering gives your operator full time "live" power on both tracks. Keeps the payload on the move. Gives bonus-load follow-through while turning, even with rock. Eliminates load-spilling "dead-track drag." Equalizes track speed for full-bite benching.

Measure the amazing yardage increase Planet Power-steered TD-24's give you—when blading material around curves; benching a bank or highwall; overcoming the sidedraft of uncentered loads; uprooting or dislodging "anchored" stumps or boulders. See what the high reverse of 7.5 mph means in speeding the shuttle-dozing cycle. Prove TD-24 Hi-Lo power shifting advantages for any crawler job. See your International Construction Equipment Distributor for a demonstration!

Using Hi-Lo power shifting— putting the inside track in high range and the outside one in low range—permits this TD-24 operator to turn safely, and drop the load over the cliff—without spillage on the turn!

Two TD-24's of the 5-unit fleet on this job, dozing rock over the brink of a cliff, 350 feet above the McKenzie River, in Oregon. "Our TD-24's are the units that do most of the close-edge work," states J. D. Steelman, operator of the U-dozer rig.

International® Construction Equipment

International Harvester Co., 180 North Michigan Avenue, Chicago 1, Illinois

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors . . . Self-Propelled Scrapers and Bottom-Dump Wagons . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Haulers . . . Diesel and Carbureted Engines . . . Motor Trucks . . . Farm Tractors and Equipment.

New Equipment . . .

Continued from page 63

tons. The engine in the basic models is a four-cylinder, water cooled, 35-hp (SAE) diesel engine. Another model is available with a six cylinder, 92-hp water-cooled gasoline engine.

The Unimog has tremendous tractive power, including ability to pull 20 times its own weight, accomplish a 60° climb or a 38° traverse with full payload and travel at speeds ranging from 2 mph to 35 mph. Six normal forward speed and two reverse speeds are available on all models.

There are power take-offs at four locations to convert engine power for operation of more than 150 different accessories and implements. Among the pieces of equipment for construction work, are a front-mounted 80-cfm air compressor to operate pavement breakers and rock drills; front-mounted 5-KVA electric power generator; front-mounted blades for back filling, snow removal and land leveling; platform-mounted welding generator for field welding jobs; front or rear-mounted winch; and a variety of special purpose equipment.

In road use, fuel consumption is approximately 23 miles per gallon; off-the-road fuel consumption is ½ to 1½ gallons of diesel fuel per hour depending on the nature of the work.

The Unimog is now in quantity production in Germany, with thousands of units in use in that country, Austria, Switzerland, France, Canada, South America and Asia. It is also widely utilized as a military vehicle by the NATO forces in Europe. The vehicle will be available through a network of franchised distributors now being established by Curtiss-Wright's South Bend Div. throughout the United States and Canada.

Self-Propelled Roller

Manufacturer: Bros, Inc., Department EE, 1057 10th Ave. S.E., Minneapolis 14, Minn.

Claims: An improved medium weight self-propelled pneumatic-tired roller has been introduced by Bros. Designated the Bros SP-54B, the machine incorporates many improved features suggested by thousands of hours of field experience.

Ballast range can be varied to produce from 3 to 10 tons compaction load. A new low silhouette body design permits increased operator visibility for rolling

in "tight" or restricted areas. Full machine height to top of steering wheel is only 91 inches.

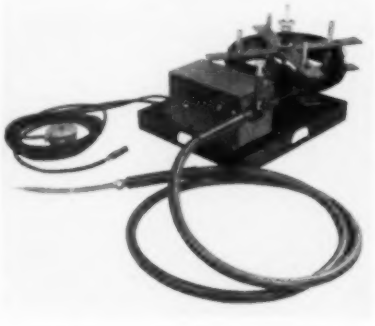
Improved power hydraulic steering and "velvet drive" hydraulic reversing clutch and transmission provide a new ease of operation and handling for shuttle or back-and-forth rolling. In combination with torque converter drive, these features offer the smoothest starting and transmission of power through an infinite speed range, from 0 to 20 mph.

Over-size wheel bearings allow 60% greater thrust than the maximum 10-ton ballast load.

Other new features are individual brakes on all four drive wheels and an increased area of brake drums which provides 95% increase in braking capacity. For additional safety, the parking brake is directly connected to drive shaft independent of the main service brakes.

Gross engine rating of the SP-54B is 73 hp.

Portable Welder



Manufacturer: Hensley Equipment Co., Department EE, 800 Peralta Ave., San Leandro, Calif.

Claims: Hensley has entered into the welding market, introducing its first welding product—the Porta Weld. The machine is a semi-automatic welder for hardsurfacing applications. Hensley is a well known supplier of accessories for earthmoving equipment.

Dual rod reel and power drive assemblies are mounted simply on a 16x18-in. sturdy base. The welder is designed to accommodate standard 12-in. reels. Wire sizes useable are $\frac{3}{32}$, $\frac{7}{64}$ and $\frac{1}{8}$-in. diameter in all semi-automatic hardfacing alloys.

Extremely lightweight, the unit with cable weighs only 57 pounds.

Bigger D8 Tractors

Manufacturer: Caterpillar Tractor Co., Department EE, Peoria, Ill.

Claims: Two completely new D8 tractors, both bigger and more powerful than their predecessors, have been announced by Caterpillar. They are the Caterpillar Series H D8 direct drive and torque converter tractors.

Introduction of the new units culminates a 3½-year development program.

The increased size and power of the new units can be seen by comparing their statistics with the old models they replace. Weight of the new direct drive D8 is 47,102 pounds, an increase of 4,377 pounds over the previous D8. In torque converter models, the 47,875-lb. weight of the new model is 4,480 pounds greater than the old machine.

Dimensionally, the newly-introduced D8's are 9 inches longer and 5 inches higher than their predecessors. Gauge has been increased from 78 to 84 inches. Length of track ground contact has been increased from 111½ to 114$\frac{11}{16}$ inches to provide adequate footing for both drawbar and front-mounted equipment applications.

The use of double reduction final drive gearing helps provide ground clearance of nearly 20 inches. This represents an increase of more than 50% over the previous D8's, giving the new machine the greatest ground clearance in its class.

Flywheel horsepower of the new units has been increased to 225 from the previous 191, an increase of 18%. Drawbar horsepower on the direct drive model is 180, increased from 155. Torque rise of the new Series H D8's engine has been increased to 20%, which provides substantially better lugging ability in coping with tough jobs.

Increased engine horsepower has come primarily from the addition of a turbocharger to the D8 engine. It is the second turbocharged track-type tractor engine in the Caterpillar line. The Cat D9 tractor is also turbocharged.

Undercarriage of the new D8 has un-

dergone design changes which add to service life in hard applications.

The undercarriage feature probably most meaningful to the machine owner is lifetime lubricated rollers and idlers, being introduced for the first time on the Series H D8. These new track rollers, carrier rollers and idlers set an industry precedent. After lubrication at the factory, these parts require no further attention during their service life. When they are eventually rebuilt, they are again lubricated.

Longer life has been built into track links by increasing their height ¼ inch, and increasing pitch length 1 inch. The diameter of track pins has been increased from 1¾ to 2 inches for greater strength. Due to increased undercarriage clearances, the new D8 tractor will accommodate 28-in. track shoes, whereas 26-in. shoes were the widest possible on the former model.

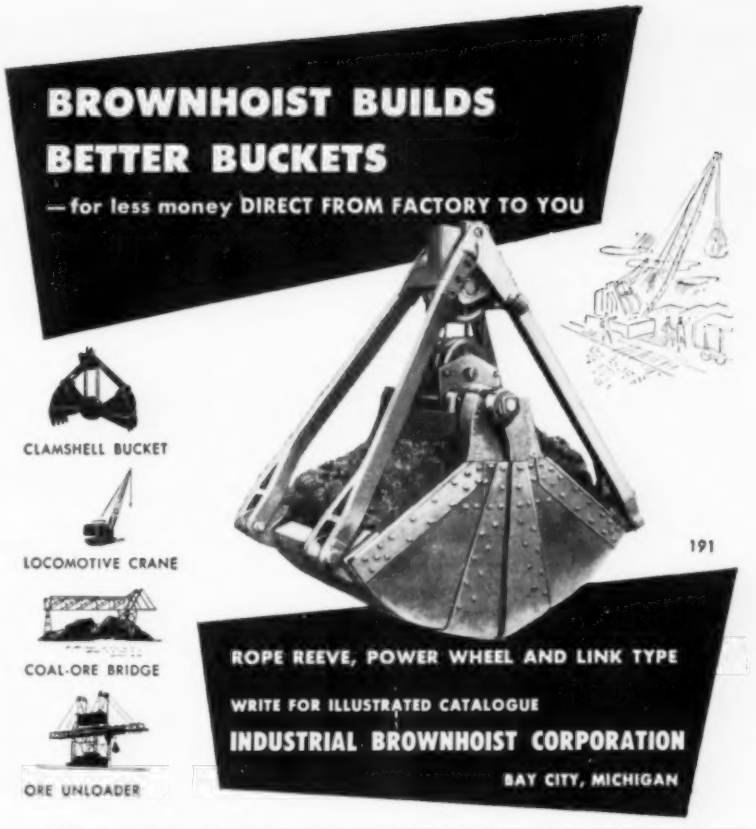
Another new feature of the D8 Series H tractor is the pressure-lubrication of the entire power train with completely filtered oil. Engine-type oil (SAE 30) is used to lubricate and cool the transmission, bevel gears and steering clutches. The compartments housing these power train components are interconnected, forming a common oil sump, which is serviced by a two-section pump.

Final drive gears and bearings are pressure lubricated with completely filtered oil by the use of a newly-incorporated final drive sump, oil pump and filter.

The new transmission on the direct drive model is directly reversing in all six speeds. Top reverse speed is nearly double that available on the previous direct drive model. In addition, the new high forward speed has been increased to 6.3 mph from 5.2 mph. The new transmission has four shafts, rather than three as on the previous direct drive transmission, and retains the easy-shifting characteristics of constant mesh gears.

The operator's seat has been raised for better visibility. As a further aid to forward visibility, the air cleaner and exhaust stacks have been aligned.

Among the retained features of the new D8 tractor are the oil-type flywheel clutch, live power to the cable control unit and in-seat starting.



Winter Liners

Manufacturer: E. D. Bullard Co., Department EE, Sausalito, Calif.

Claims: New dark green Bullard winter liners are designed to give protection to the head, face and neck against cold, snow and rain, with complete comfort to wearer. Metal snaps and buckles have been eliminated from all models and they can be laundered over and over again with no damage to materials.

Drill style liners are made from repellent fabric that is wind and fire resistant. One style has tie strings and the other an elastic chin strap that fastens into a plastic eye.

Knit style liners are manufactured from dark green stretch-on nylon fabric. The skater type protects the neck and ears. The skull type covers only the top of the head.

New Trade Literature

Subject: **Wheel Tractors**

Content: International Harvester's line of new wheel tractors in six power sizes ranging from 12 to 72.5 hp for commercial and industrial use is described in a 16-page catalog. Emphasis is given to the new six-cylinder engines used on the larger tractors; torque amplifier drive; new fast reverser unit; independent power take-off; new larger and more powerful internal hydraulic systems; two-point traction-control fast-hitch; and new industrial three-point hitch. Ask for catalog CR-1374-H.

Where to get: International Harvester Co., Department EE, 180 N. Michigan Ave., Chicago 1, Ill.

Subject: **Corrugated Pipe**

Content: Bethlehem's 76-page booklet, *Solving Drainage Problems*, has been revised. The second edition contains up-to-date information on the advantages, fabrication, design and installation of copper-bearing galvanized corrugated steel sheets for culverts. Adding to its value is an inside pocket containing a supplementary set of *New Tables* (booklet 477) and three 14-in. x 20-in. loose sheets of tables for evaluating hydraulic flow friction. The edition is illustrated with photographs, charts and tables. Applications of the corrugated pipe, such as in subsurface drainage, farm pond spillways, highway and railway culverts and soil drainage outlets, are cited. Ask for booklet 425-A with booklet 477 inserted.

Where to get: Bethlehem Steel Co., Department EE, Bethlehem, Pa.

Subject: **Rock Drills**

Content: Atlas Copco offers three new product folders. Leaflet E-1106 describes the firm's BMK automatic pusher legs for rock drills. The two-color leaflet includes cutaway drawings as well as principal data regarding the BMK pushers which are designed for use with most Atlas Copco rock drills. Leaflet E-1097 describes the new "Terrier" rock drill, type BBD-12-WH. The light-weight "Terrier" is designed primarily for short-hole drilling, boulder-blasting and bolt hole drilling. Folder E-568 discusses carbide inserts now incorporated in Sandvik Coromant integral drill steels. This four-page folder shows how the inserts have been enlarged during the last seven years and compares effective footage achieved with new type steels.

Where to get: Atlas Copco Eastern, Inc., 151 Linwood Ave., Paterson, N. J.; and Atlas Copco Pacific, Inc., 930 Brittan Ave., San Carlos, Calif.

Subject: **Cost Record Books**

Content: To assist owners in determining the cost of owning and operating equipment, Caterpillar offers a special 24-page *Monthly Time and Cost Record Book*. Twelve sets of pages are provided on which to record, day by day, each month's individual machine expenses for an entire year. At the end of the record section is an annual summary sheet where the totals for each month can be entered to obtain annual cost figures. Spaces are provided for recording both the quantity and cost of diesel fuel, gasoline, lubricating oil, grease, filters, hydraulic oil, repair labor and operator's time. There is space for the type and amount of miscellaneous costs, such as transportation, tires, tire repair and other items. At the end of each month the columns may be totaled to determine expenses for that particular month. To help compute owning and operating costs, a section at the back of the book explains simple methods of calculation. In order to record expenses as they occur in the field, a pocket size *Daily Time And Cost Record* booklet is also available. Periodically, these figures may be transferred from the daily to the monthly cost record book.

"Busy, Mr. Miller?"

Ask for *Monthly Time and Cost Record Book*, Form 33215, and *Daily Time and Cost Record Booklet*, Form 32818-G.

Where to get: Caterpillar dealers or Advertising Div., Department EE, Caterpillar Tractor Co., Peoria, Ill.

Subject: **Law for Contractors**

Content: Rights and liabilities involved in the complex relations of the construction industry are reviewed in *Legal Aspects of Construction*, a 400-page work by Walter C. Sadler. The author traces the pattern of the business of contracting and examines the roles of the contractor, designer, owner and financier. He discusses a number of actual cases illustrating the rights and liabilities of the parties-in-interest. This book is unique in its recognition of construction as a business involving the potential conflict of interests of contractors, subcontractors, sub-subcontractors and trade unions, as well as factors of individual union contract provisions and federal, state and local regulations and codes. The author is a well known consultant in the construction field. He is a member of the American Society of Civil Engineers and the American Bar Assn., and holds the post of professor of civil engineering at the University of Michigan. Price of the volume is $8.50.

Where to get: McGraw-Hill Book Co., Inc., Department EE, 327 W. 41st St., New York 36, N. Y.

New Movie . . .

Subject: **Tractor Scrapers**

Content: A 16-mm 22-minute color-sound movie highlights the design and operating features of the Michigan line of tractor scrapers. The title is *Bonus Loads*. The 10½-yd. heaped model 110 tractor scraper, the 18-yd. model 210 and the 27-yd. model 310 are seen working on actual job sites. The movie shows how loads are picked up in various kinds of terrain—rock-hard gypsum, ballbearing sand, sand clays, silts and topsoils. The film's narration explains the scraper hydraulic control and operation; power-shift transmission with torque-converter; hydraulic ejection mechanism; and tire and wheel features.

Where to get: Clark Equipment Co., Construction Machinery Div., Department EE, Pipestone Rd., Benton Harbor, Mich.

Notes from the Manufacturers

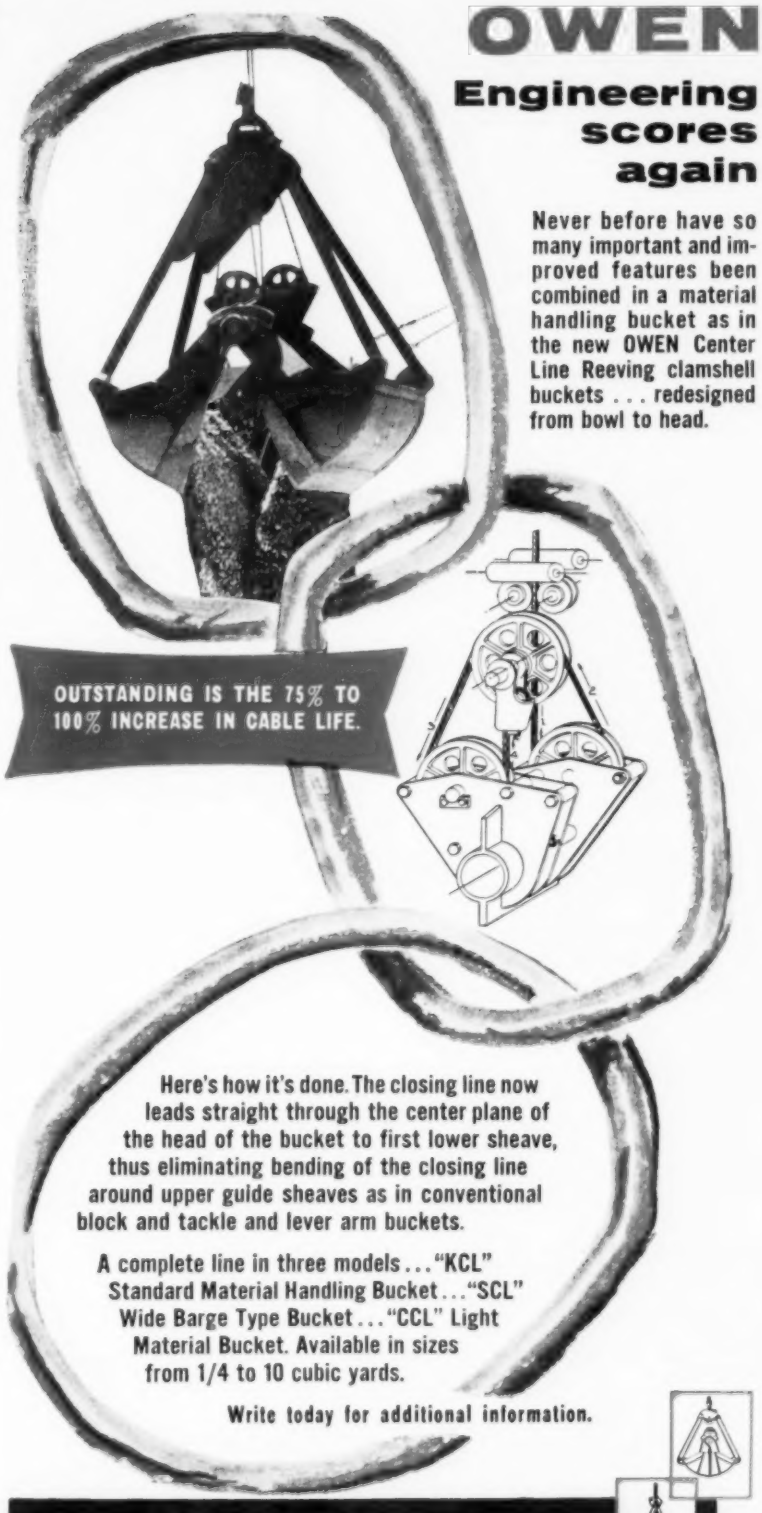
Bucyrus-Erie Co., South Milwaukee, Wis., has appointed Seabrook Machinery, Inc., Tallahassee, Fla., as its excavator distributor for northcentral Florida and southwestern Georgia. Seabrook Machinery will offer sales and service on the full line of Bucyrus-Erie ⅜ and 4-yd. models and 10 to 35-ton capacity Transit Cranes. Equipment parts and servicing facilities are located at its plant, 625 W. Gaines St., Tallahassee. The firm plans to establish a branch at Albany, Ga.

Cummins Engine Co., Inc., Columbus, Ind., has established Cummins Diesel International Ltd., to promote the sale and service of its diesel engines in international markets. The subsidiary company is headquartered in Nassau, Bahama Islands. Additional offices will soon be opened in Europe and South America. L. E. Carr, manager of Cummins export distribution, has been named resident manager of the new company in Nassau.

Heil Co., Milwaukee, Wis., has added Ed R. Curry to its Kansas City (Mo.) district office as sales representative for dump truck bodies and hydraulic hoists. Curry will serve the states of Missouri, Kansas, Nebraska, Iowa and part of South Dakota. He has over 10 years' background in the truck equipment industry.

International Harvester Co., Chicago, Ill., has appointed C. E. (Skip) Jones manager of engine sales for its construction equipment division. Jones joined IH in 1936, and has held construction equipment posts in Quincy and Aurora, Ill., and in the Chicago general office.

McKiernan-Terry Corp., Dover, N. J., has named Parker Equipment Co., 29 E. 2nd St. South, Salt Lake City, distributor in Utah for its line of steam, air and diesel pile hammers and accessory equipment.


OWEN
Engineering scores again
Never before have so many important and improved features been combined in a material handling bucket as in the new OWEN Center Line Reeving clamshell buckets . . . redesigned from bowl to head.
OUTSTANDING IS THE 75% TO 100% INCREASE IN CABLE LIFE.
Here's how it's done. The closing line now leads straight through the center plane of the head of the bucket to first lower sheave, thus eliminating bending of the closing line around upper guide sheaves as in conventional block and tackle and lever arm buckets.
A complete line in three models . . . "KCL" Standard Material Handling Bucket . . . "SCL" Wide Barge Type Bucket . . . "CCL" Light Material Bucket. Available in sizes from 1/4 to 10 cubic yards.
Write today for additional information.
The OWEN BUCKET Co.
BREAKWATER AVENUE, CLEVELAND 2, OHIO
BRANCHES: New York • Philadelphia • Chicago
Berkeley, Calif. • Fort Lauderdale, Fla.

TO ADVERTISE: All advertising in this section is payable in advance. Rate: $1.00 per line, or $12.00 per inch of 12 lines. Minimum charge $4.00. No discounts; no commissions. Please count your copy carefully to avoid delay. Each line contains 41 characters (34 characters if all capital letters are used). Count spaces and punctuation as one character each. Allow 10 characters for box number, if blind advertisement is desired. Be sure to enclose the correct amount of money with your order. Closing date—10th of preceding month. Example: January closes December 10th.

TO INQUIRE: Be sure to address your inquiry to the advertiser by using the correct box number. Mail your letter in care of Excavating Engineer, South Milwaukee, Wisconsin. Write each advertiser a separate letter. Do not write us for name and address of advertiser. This information will not be given out. We have no information about the equipment advertised other than that shown in the advertisements themselves.

LARGE SHOVELS, CRANES, DRAGLINES — 3 YDS. & UP

FOR SALE

630-B Bucyrus-Erie Elec. Drag, 195', 16-yd.
15-W Bucyrus-Erie Elec. Drag, 215', 13-yd.
9-W Bucyrus-Erie Diesel Drag, 165', 13-yd.
7400 Marion Diesel Drag, 175', 13-yd.
625 Page Diesel Drag, 150', 10-yd.
723 Page Diesel Drag, 130', 10-yd.
360-M Marion Elec. Drag, 175', 8-yd.
621-S Page Diesel Drag, 125', 7-yd.
200-W Bucyrus-Erie Diesel Drag, 125', 6-yd.
5-W Bucyrus-Erie Diesel Drag, 100', 6-yd.
2400 Lima Dragline, 130', 5-yd.
4500 Manitowoc Drag, 120', 5-yd.
120-B Bucyrus-Erie Elec. Drag, 115', 5-yd.
1900, 3500 & 3000 Manitowoc Cranes
111-M Marion Drag, 100', 4-yd.
1055 P&H Drag, 80', 3½-yd.
1201 Lima Dragline, 85', 3-yd.
84-B Bucyrus-Erie Drag, 80', 2½-yd.
3360 Marion 26-yd Elec. Shovel
750-B Bucyrus-Erie 20-yd. Elec. Shovel
1050-B Bucyrus-Erie 20-yd. Elec. Shovel
3480 Marion 18-yd. Elec. H. L. Shovel
131-M Marion 7-yd. Elec. Shovel
170-B Bucyrus-Erie 6½-yd. Elec. Shovel
4161 Marion 6-yd. Elec. Shovel
120-B Bucyrus-Erie 4-yd. Elec. Shovel
111-M Marion 4-yd. Standard Shovel
54-B Bucyrus-Erie 2½-yd. Standard Shovel
Large selection of smaller Shovels and Draglines available
Model T-750 Reich Truck Mounted Rotary and Down-the-Hole Drill
Euclid Trucks—Rear and Bottom Dump
Truck Cranes, Dozers, Scrapers, Front End Loaders, Drills, Buckets, Attachments and other misc. equipment available.

FRANK SWABB EQUIPMENT CO., INC.
313 Hazleton Nat'l. Bank Bldg.
Hazleton, Pa. **GLadstone 5-3658**

Lima Model 1201 shovel, serial #3339-10, with 32-ft. 6-in. boom, 22-ft. dipper handle, 3½-cu. yd. Amsco dipper. Cummins diesel, 2-KW Kohler light plant. Available about Jan. 1, 1959. Price F.O.B. cars Ely, Nev. Price: $80,000. For additional information please contact:

LANG CONSTRUCTION EQUIPMENT CO.
P. O. Box 1646 **Salt Lake City, Utah**
Phone: Davis 2-1241

FOR SALE OR RENT

Bucyrus-Erie, 71-B dragline (used 240 hours) 4½-cu. yd. new style bucket (B.E.) Long wide crawlers, 42-in. treads, GMC Series 6-110 diesel engine, Clark Torcon torque converter, 70-ft. pendant suspended boom. Save, $15,000 or Rent.

CALL—WRITE—WIRE

J. P. WAITE, INC.
3304 W. Pierce St. **Ev. 4-1900**
Milwaukee 1, Wis.

LARGE SHOVELS, CRANES, DRAGLINES — 3 YDS. & UP

9-W Bucyrus-Erie electric dragline No. 655 160' —11½-yd. (needs new base). Price $150,000. Parts inventory for above, approx. $20,000. Complete sub-station—1500KVA 66M volts primary—4160 volts secondary. Price $10,000.
855 P&H shovel—2-yd. No. 9187. With parts inventory. Price $15,000.
80-D Northwest shovel—2-yd. No. 7115. With parts inventory. Price $20,000.
No. 12 Caterpillar road grader. Price $7,000.
6 in. Hardscog horizontal drill. Price $500.
All of above in good working condition. Priced as is, where is.

THE POWHATAN MINING CO.
Division of the North American Coal Corp.
Bloomingdale, Ohio
Phone: Smithfield, Ohio 2401

Bucyrus 1050-B shovel, 20-36 yd., 133' bm.
Bucyrus 550-B shovel, 16½-20 yd., 85' bm.
Bucyrus 320-B shovel, 10-yd., 93' bm.
Marion 26-yd. electric strip shovel.
Bucyrus 9-W elec. walking drgl., 12-yd.
Marion 360-elec. drgl., 8-yd., 175' bm.
Washington 50 ton Whirley gantry crane.
Clyde 30 ton steam Whirley crane, wheels.
Dredges, hyd., 18", 16", 12" diesel, stm.
Dredges, gold placer, 4½', 6', 8'.
Derricks, 125, 75 ton (3) new, used. S/L.
Locomotives, 100, 80, 65, 50, 35 tons.

H. Y. SMITH COMPANY
828 N. Broadway **Milwaukee, Wis.**

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

38-B Bucyrus-Erie shovel attachment.
38-B Bucyrus-Erie 1½-cu. yd. shovel #85914 with Caterpillar diesel engine, 33" wide treads. Located in Seattle. Excellent condition.
20-B Bucyrus-Erie shovel with Hercules RXC gas engine, 1940—overhauled. Serial #16822.
54-B Bucyrus-Erie 2½-cu. yd. shovel with Cummins diesel engine and torque converter, 36" wide treads. Serial #118053. Machine like new.
Model 25 Northwest diesel shovel and pull shovel, GMC diesel engine. Serial #7723. Located in Seattle.
Model 25 Northwest dragshovel with Caterpillar D318 diesel engine. New tracks. In excellent condition. Serial #11986. Located in Seattle.
Model L-41 Lorain Hoe with Waukesha gas engine. Serial #17832.

CLYDE EQUIPMENT COMPANY
3410 First Ave., So. **Seattle 4, Wash.**

Northwest 25 dragline 45-ft. boom and Cummins diesel engine. Serial #6488.
Price f.o.b. Greensboro, N. C. $7,000
Quickway Model "E" dragline machine with 35-ft. boom, GM 2-71 diesel engine, and mounted on Army 6 x 6 Truck. Serial #5768.
Price f.o.b. Greensboro, N. C. $5,000
Lorain TL-20 combination shovel dragline backhoe machine with Cat D311 diesel engine. Serial #18422.
Price f.o.b. Greensboro, N. C. $10,500
Shovel front for Northwest 25 w/trip.
Price f.o.b. Greensboro, N. C. $1,200

E. F. CRAVEN CO.
Greensboro, N.C.
Phone: BRoadway 3-5521

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

1—705 P&H dragline, 2-yd. with 55-ft. boom.
1—Northwest model 25 crane with 45-ft. boom.
1—Model H Scoopmobile, hydraulic loader, ¾-yd. 1955 model, excellent condition.
1—12-ton single axle trailer (7:50 x 20 tires new) air brakes new.
1—Model C Scoopmobile 22-ft. tower, pallet fork or bucket, excellent condition.
1—Model BB120 Wooldridge scraper, 14 to 18-yd., good.
1—Model 41 Lorain ¾-yd. shovel with Cat D4600 engine, 1945 model, needs some repair.
2—365 Gardner-Denver compressors—good.
1—Model 10-20 Unit crane mounted on Dart truck, excellent.
1—1½-yd. Kiesler clamshell-rehandling.
1—HD-20 Allis-Chalmers with Cat 25 DDPCU.
1—Model 300 International utility tractor with Wain-Roy backhoe, 1956 models, excellent.
1—TD-9 International tractor w/Henry hyd. dozer.

CONTRACTORS SUPPLY
620 E. 18th St. **Kansas City, Mo.**

COMPRESSORS

1—Chicago Pneumatic 365 RD2 portable, 4 pneumatic tires—machine in very good condition.
1—Ingersoll-Rand DR-315, portable mounted on 4 pneumatic tires—machine like new. Located at Casper branch.

EXCAVATORS

1—Lima 604, 1½-yd. shovel, powered by Cummins H1S diesel engine. This machine in good operating condition and priced for a quick sale. Located at Casper branch.
1—P&H crane mounted on 12-wheel Maxi carrier, powered by Waukesha gas engine, 60-ft. boom. This machine is ideal for industrial application.
1—Bucyrus-Erie 51-B combination dragline and lifting crane, powered by NHRS—600 diesel. Torcon converter, 100-ft. boom, mast and pendant suspension—Less than 1,600 hours on machine. If you are in need of this size machine you will certainly appreciate the care this machine has had.

TRACTORS

1—International TD-24, equipped with double drum power control unit and straight dozer. This tractor was new in 1955—We have made necessary repairs—Priced to sell.
1—Allis-Chalmers HD-6G Tractomotive front-end loader, Tractomotive ripper model TR6 with two ripper shanks. This machine was new in 1957 and has had good care.

THE COLORADO BUILDERS' SUPPLY CO.
1534 Blake St. **Denver 2, Colo.**

MICHIGAN Mdl. C-24 ¾-yd. backhoe, 45-ft. crane boom, fairleads, Serial #4005, Hercules gas engine, extended crawlers.
Very good condition $10,500
LORAIN Mdl. TL25, Serial #19697, ¾-yd. comb. backhoe and shovel, Waukesha gas engine, standard crawlers, 22-in. treads. Reconditioned.
INSLEY crawler mounted backhoe, Type "K", 24-in. bucket, standard crawlers, Serial #6923, Waukesha gas engine, year 1955.
Excellent value $7,850
LINK-BELT Mdl. LS-51 ½-yd. comb. shovel and backhoe, standard crawlers, 20-in. treads, Wankesha gas engine, speedomatic controls, Serial #6G26.
Very good condition $6,500
KOEHRING Mdl. 405, 1-yd. shovel, Serial #9111, standard crawlers, Cat D318 diesel engine. Very good condition $25,000

CHAPMAN BINDER MACHINERY CO.
Brighton St., Union, N. J.
MUrdock 8-0060

SMALL SHOVELS, CRANES, DRAGLINES — UP to 2½ YDS.

⅜-yd. model 10-B Bucyrus-Erie Shovel (1949), Hercules gas engine. Good working condition. Available immediately. $5,000, our yard.

½-yd. model H-3 Bucyrus-Erie Hydrocrane (1952) mounted on Ford F-600 truck chassis, equipped with steel operator's cab, tagline reel, clamshell bucket. Very good condition.

½-yd. model H-3 Hydrocrane (1950) mounted on IHC A-162 truck chassis, equipped with tagline reel, clam bucket. Good condition.

¾-yd. model H-5 Bucyrus-Erie Hydrocrane upper works, 9-ton capacity, equipped with two-piece telescopic boom, tandem outriggers, Ford Industrial engine, operator's cab with heater. Good condition. Mounted on your truck—$12,500.

¾-yd. model 15-B Bucyrus-Erie hoe-crane-clam-dragline combination in good working condition. Diesel power.

¾-yd. model 375 American crawler shovel (new 1949) with Waukesha gas power. Can go right to work. $3,750.

¾-yd. model 255A P&H dragline equipped with 40' boom, fairlead, Cummins diesel new last year, grouser treads. Overhauled and refinished. Very good condition. $8,500 at our yard.

¾-yd. model "M" Insley dragshovel (new 1955) equipped with long wide crawlers, Cat D315 diesel engine. Good condition. $9,000 at our yard.

¾-yd. model 1020 Unit shovel equipped with GMC diesel engine. Good working condition. Priced to sell.

1-yd. model LS-90 Link-Belt shovel new 1953, Waukesha gas power. Excellent condition. To close out at $12,500, our yard.

1-yd. model 30-B Bucyrus-Erie Maxi-mounted wagon crane 35-ton capacity, 6 x 4 carrier, 14.00 x 20 tires, duals on all wheels, GMC Series 4-71 diesel engine, 90-ft. pin-connected boom, pendant suspension, 30-ft. boom jib, tagline reel, independent propel, 4 mph travel speed. Machine used 4 months. Todays' replacement cost $72,500. Priced to sell at $52,000, our yard.

1½-yd. model 33-B Bucyrus-Erie crane-clam-dragline machine, 70-ft. boom, independent boom hoist, gas power. Very good condition. A lot of machinery for $15,000, our yard.

1½-yd. model 604 Lima crane-dragline machine new 1951, Cummins diesel engine, 80-ft. boom and fairlead. Was overhauled last winter. Very good condition. Price $30,000.

2-yd. model 820 Lorain crane-clam-dragline machine, Cat D13000 diesel engine, swamp cats, 100-ft. flange-type boom, fairlead, pressure lubrication system. In excellent condition. Rented, available 30 days.

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3304 W. Pierce St. — P. O. Box 313
Milwaukee 1, Wis. — EVergreen 4-1900

Lorain Model L50J, 1 cu. yd. Crane, Clamshell, Dragline Combination, 70' boom pendant suspension.
$14,000 .....FOB Elizabethtown, Ky.

Bucyrus-Erie Model 22-B ¾ yd. Shovel, 26" treads. Powered by GMC Model 371 Diesel engine. With torque converter. Like new condition.
$23,500 .....FOB Louisville, Ky.

Link-Belt Model LS-90 with Shovel Front Attachment, powered by GMC Model 4-71 Diesel engine.
$10,500 .....FOB Elizabethtown, Ky.

Koehring Model 304, ¾ yd. Drag Shovel. Powered by International UD-14 Diesel engine.
$10,500 .....FOB Elizabethtown, Ky.

Lorain Model L41, ¾ yd. Crane, Dragline, Clamshell, with 40' boom, tagline and fairleads, pendent suspension. Powered by Caterpillar Model D-318 Diesel engine.
$8,900 .....FOB Elizabethtown, Ky.

Bucyrus-Erie Model 11-B Transit Crane with 35' folding type boom for clamshell, screw jack outriggers. Rented only two months—like new condition. For rent or sale.

Koehring Model 304, ¾ yd. Shovel, powered by GMC Model 371 Diesel engine.
$10,500 .....FOB Elizabethtown, Ky.

Insley Model K12, ¾ yd. Shovel, Dragline with 40' boom and Buda Model HP-326 gasoline engine.
$4,500 .....FOB Evansville, Ind.

Write—Wire or Phone Jim Waddell

BRANDEIS MACHINERY & SUPPLY CO.
Brook & Warnock Sts. — P. O. Box 1705
MElrose 7-4741 — Louisville 1, Ky.

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

CRANES

LINK-BELT Speeder Mod. LS85—¾-yd. capacity crane, 50-ft. boom, 2 sheave boom-point, 20-in. pads. Powered by Cat D318 diesel engine. Reconditioned. $10,500.

LINK-BELT Speeder Mod. LS90, 1-yd. capacity crane, 50-ft. boom, two sheave boom-point, 24-in. pads, Cat D318 diesel engine. Reconditioned. $12,500.

LIMA Mod. 34 Paymaster, ¾-yd. crane, 35-ft. boom, GM diesel engine. As inspected. $9,500.

SHOVEL

BUCYRUS-ERIE 38-B shovel, 20-ft. 5-in. dipper stick, 1¼-cu. yd. dipper, powered by International diesel engine. Rebuilt. $38,500.

SHOVEL ATTACHMENT

BUCYRUS-ERIE Tunnel Shovel attachment for 22-B consisting of 14-ft. boom, 12-ft. 10-in. stick, 1-cu. yd. rock dipper, crowd drum, sprocket and crowd chain. Excellent condition. $3,500.

BACKHOES

BUCYRUS-ERIE 15-B ½-yd. dragshovel, 34-in. bucket, 20-in. tracks. Buda gasoline engine. Operating condition. 30 day guarantee. $9,000.

P&H Mod. 255A backhoe ¾-yd., 26-in. tracks, powered by Diesel engine. Reconditioned. $17,000.

TRUCK CRANE

LIMA 44T truck crane, 25-ton combination clamshell and lifting crane, 80-ft. boom, 30-ft. jib, Rudomatic tagline, Dart carrier, 9-ft. wide, Waukesha engines. Very good condition. 30-day guarantee. $30,000.

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CATERPILLAR Mod. DW21 tractor with Cat No. 21 scraper. Certified Buy. 2 units each $25,500.

BUCYRUS-ERIE Mod. B-170 scraper (18¼-yd. cap.) with 21:00 x 25 20-ply tires all around. Excellent condition. $7,500.

(3) LETOURNEAU Mod. LS, 4-wheel scrapers. (11-yd. cap.) Excellent condition. Each $4,500.

TRACTORS

CATERPILLAR D7, 22-in. tracks, crankcase guard, elec. starter, canopy top, w/Cat #46 hydr. control and Cat 7S bulldozer. Certified Buy. $16,000.

INTERNATIONAL TD-24 diesel tractor with crankcase guard, 24-in. tracks, pull hook, elec. starter, canopy top, bulldozer blade and DDPCU. Good operating condition. $12,000.

ALLIS-CHALMERS HD-20H diesel tractor w/ Garwood bulldozer and DDPCU. Operating condition. $12,500.

CATERPILLAR D8 diesel tractor with oil clutch, 24-in. tracks, pull hook, canopy top and Cat 8S cable blade with Cat No. 25 DDPCU. Recent 13A series. Bonded Buy. $22,500.

TRENCHER

CLEVELAND No. 95 Trencher, option 5, 16-in. buckets, 21½-in. cut, powered by Continental gasoline engine. Rebuilt. Good value. $6,600.

Subject to inspection & prior sale

H. O. PENN MACHINERY CO., INC.
140th St. & East River — CYpress 2-4800
New York 51, N. Y.

1—Michigan C-16—backhoe, ½-yd. 22" bucket, 9'9" crawlers 20" wide, Hercules gas engine JXD #1742230, machine #3797, 4 years old.

1—Koehring 303—¾-yd. backhoe, 30" bucket, 10'6" crawlers, 24" wide, Waukesha gas engine #484150, 4⅜" x 5¼", serial #2337.

1—Worthington 16-S Concrete Mixer on 4 pneumatic tires with power skip and water tank, serial #5548 powered by Wisconsin VF-4 gas engine, 4 years old.

1—Osgood 200—½-yd. backhoe with 22" bucket, 11' crawlers, 22" wide, powered by Continental gas engine, machine #6285, 5 years old.

1—International TD-14 crawler loader Model 14K3 with Drott skid shovel, 2½-yd. serial #B-2463, only 1½ years old, excellent shape.

1—Bucyrus-Erie 15-B backhoe attachment with ½-yd. bucket, 34" wide with side cutters, straight boom like new.

1—Bucyrus-Erie 15-B ½-yd. shovel attachment, perfect.

1—Owens heavy duty ¾-yd. digging bucket.

1—Ruhr M1½-yd. heavy-duty grapple. New—excellent buy.

1—Wiley PM-215 Patchmobile portable asphalt patching unit on two pneumatic tires, complete with rotary dryer.

2—CMC Jeteretes with all accessories. Excellent condition.

S. M. CHRISTHILF & SON, INC.
Timonium Road & Harrisburg Expressway
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SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

CLEARANCE SALE OF ALL USED EQUIPMENT

PRICES HAVE BEEN REDUCED 5% to 30%

BUCYRUS-ERIE Model 22-B ¾-yd. hoe, S/N 45148. Powered by UD-14 IHC diesel engine. Has been repaired & in good condition. Can furnish as a crowd shovel at same price. U-179 $13,600.

BUCYRUS-ERIE crowd shovel attachment for model 15-B, ½-yd. excavator. Very good condition. U-40 $1,800.

BUCYRUS-ERIE crowd shovel attachment for models 20-B or 22-B ¾ yd. shovels. New & unused, but included in sale. U-201. $2,750.

AUSTIN WESTERN BADGER shovel & backhoe, S/N 3386, powered by IHC UD-9 diesel engine. In fairly good operating condition. U-116 $3,750.

HANSEN model 31 shovel, backhoe, & dragline. S/N 2120. Has IHC UD-6 diesel engine. Condition is fair to poor. U-32 $3,500.

NORTHWEST crowd shovel attachment for model 25, ¾-yd. New & unused. U-198 $2,250.

UNIT model 10-20 backhoe, includes crowd shovel, dragline, dragline bucket and clamshell bucket S/N 1719. Good condition. U-249 $8,500.

YALE electric crane, Model K42-SH-6-7-781, #6000 capacity, 12 to 18-ft. telescopic revolving boom & hard rubber tires. It has never been used, but included in sale. Govt. surplus, unit sells new from factory for approximately $17,900. Our price less batteries & battery charger is only $2,950. U-81.

WELLMAN 2½-yd. dragline bucket, model DXL. S/N D1789. Has never been used. $1,200.

SALE has been extended to February 28, so call, wire or write today!

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P. O. Box 1646 — Salt Lake City, Utah
Phone: DAvis 2-1241 — TWX No. SU-278

Bucyrus Erie 38-B crane & drag.
Bucyrus-Erie H-5 Hydrocrane
Rex 34-E DD Paver
Blaw-Knox batch plant

L. M. KELLER & SON
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FOR SALE

2—Bucyrus-Erie 54-B Ward-Leonard electric shovels, serial Nos. 19397 and 19398 with 2½-yd. dippers.

1—Bucyrus-Erie Model 27-T electric blast hole drill. Shop #23446 with 15-hp G.E. motor.

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Purchasing Dept. — 700 Sellwood Bldg.
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9-W ENGINE

New unused current model Cooper-Bessemer JS-6-D 13-in. x 16-in. diesel engine. Normally rated 705 hp @ 514 rpm. Will sacrifice. Contact J. E. Smart, Bucyrus-Erie Co., South Milwaukee, Wis., Phone: SO 2-0900.

22-W Two new unused IHC, U-164, 4-cylinder 3½ x 4½-in. closed gasoline power units.

48-L Two new unused Waukesha 6 WAKU, 6-cylinder 6¾ x 6½-in. natural gasoline power units.

1-W One rebuilt IHC, U-1, 4-cylinder 2⅜ x 2¼-in. closed gasoline power unit. Never operated after rebuilt.

Above engines offered as is f.o.b. South Milwaukee, Wis., subject to prior disposition. Will sacrifice for quick sale.

J. E. Smart
BUCYRUS-ERIE CO.
South Milwaukee, Wis.
Phone: SO 2-0900

MISCELLANEOUS EQUIPMENT

CATERPILLAR MODEL D8 DIESEL TRACTOR, Serial No. 13A-568, equipped with oil type flywheel clutch, electric starting, crankcase and roller guards, Caterpillar model 8A angle blade bulldozer, Caterpillar model 25 rear mounted double drum cable control unit. $10,250.

CATERPILLAR MODEL D7 DIESEL TRACTOR, Serial No. 3T-16033, equipped with Caterpillar model 7A angle blade bulldozer, Caterpillar model 24 front mounted cable control, 20" tracks, track roller guards, electric starting. Machine is in good condition. $15,500.

CATERPILLAR MODEL D6 74" DIESEL TRACTOR, Serial No. 9U-1227, equipped with Caterpillar model 46 front mounted hydraulic control, NEW Caterpillar model 6A hydraulically controlled angle blade, electric starting, crankcase guard, 20" grouser tracks. Machine in good condition. $12,750.

ALLIS-CHALMERS HD-20 DIESEL TRACTOR, Serial No. HD20-H3461, powered by GM diesel engine, equipped with push plate, torque converter, crankcase guard, roller guards, electric starting, Caterpillar model 25 rear mounted double drum cable control unit. $7,250.

ALLIS-CHALMERS MODEL HD-21A DIESEL TRACTOR, Serial No. HD21A-8528, equipped with Gar Wood model 281 double drum cable control unit, Gar Wood cable controlled straight blade bulldozer, track roller guards, crankcase guard, torque converter, 26" grouser tracks. Machine in good condition. $17,500.

INTERNATIONAL MODEL TD-24 DIESEL TRACTOR, Serial No. TDE-5394, equipped with Bucyrus-Erie straight blade bulldozer, Bucyrus-Erie P29 cable control, 7-roller frame, 22" grouser tracks. Good condition. $9,500.

BUCYRUS-ERIE 10-B SHOVEL AND BACKHOE COMBINATION, Serial No. 72711, powered by Buda gasoline engine with electric starting, mounted on 14" flat pads, equipped with 13' shovel boom with 11' handle, ¾-cu. yd. dipper bucket, 15' straight boom backhoe attachment with ¾-cu. yd. drag bucket. Fair condition. $4,250.

CEDARAPIDS MODEL 4A-GR 2540 PORTABLE PRIMARY CRUSHER, Serial No. 12934, equipped with 42" x 10' heavy duty apron feeder, 48" x 4' double deck vibrating grizzly, 36" x 30' undercrusher conveyor, all mounted on steel truck frame with tandem axle with dual 10:00 x 20 tires and kingpin, powered by and equipped with Cat D13000 diesel engine, Serial No. 4S-6604. Good condition. $37,500.

PIONEER MODEL 45VE PORTABLE SEMI-ELECTRIC CRUSHER AND SCREENING PLANT, Serial No. 45VE-125, equipped with 1036 RB jaws, 2240 RB rolls, 4 x 12 inclined vibrating screen, 24" x 26'4" overhead conveyor, 24" x 16'10" undercrusher conveyor, all mounted on steel truck frame, with tandem axle and 9:00 x 20 tires with air brakes, 30" x 60' portable delivery conveyor, with 11:00 x 20 tires, 30" x 60' portable feeder conveyor with 11:00 x 20 tires, 24" x 50' portable sand conveyor with 7:50 x 20 tires, Miller & Smith reciprocating feeder with wings. All conveyors are electric motor driven, equipped with and powered by Cat D326 diesel electric set, main plant powered by and equipped with Cat D337 diesel engine. Good condition. $75,000.

CEDARAPIDS MASTER TANDEM PORTABLE CRUSHER AND SCREENING PLANT, Serial No. 14647, equipped with 1036 RB jaws, 4022 RB rolls, 4 x 12 (2) deck horizontal vibrating screen, 24" x 14' undercrusher conveyor, 24" x 25' return conveyor, mounted on steel truck frame with air brakes, tandem axle with dual 10:00 x 20 tires, front dolly with dual 10:00 x 20 tires, 30" x 60' portable feeder conveyor with swivel drive, mounted on 7:50 x 20 tires, 30" x 60' portable delivery conveyor, with mech. drive, mounted on 7:50 x 20 tires, 24" x 40' portable sand conveyor, with mech. drive, mounted on 7:00 x 20 tires, 30" reciprocating feeder, complete plant powered and equipped with Caterpillar model D17000 diesel engine, Serial No. 8S-6825. Good condition. $45,000.

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(2) ¾-cu. yd. type AX medium duty dragline buckets complete with all fittings. Weight—950 lbs. Price $710 each. f.o.b. Evansville, Ind.

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2—New, unused, 3-cu. yd. type "BU", Bucyrus-Erie lightweight dragline buckets with all fittings. Weight—5,150 pounds each. Special reduced price—$1,935 each. F.O.B. Evansville, Ind.

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BARBER-GREENE model 879-A Finisher. Lays 8 to 12-ft. strip. Powered by LeRoi gas engine. Very good condition. U-244 $6,800.

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BARBER-GREENE model 840-B asphalt plant. Includes mixer, hot elevator, dryer, dust collector, tanks, piping, and 879-A Finisher. Equipment is only 2 years old and in excellent condition. Immediately available. Only $29,500.

CARCO model G-4 logging winch. S/N 3844. Excellent condition. U-303 $1,500.

CARCO model "J" logging winch. 1955 model. Good as new. U-65 Only $2,400.

CLEVELAND Wheel Ditcher, "Baby Digger". S/N 306. Powered by Hercules gas engine. Has 4½-ft. digging depth. Good working condition. U-1 $1,450.

BUCYRUS-ERIE model S-90 tractor drawn scraper. Good condition. U-189 $3,100.

LETOURNEAU 12-yd. tractor drawn scraper, Model LP. Good condition. U-271 $3,750.

ALLEN cab for IHC TD-14A crawler tractor. $150.

GARDNER-DENVER Air Trac Drill, S/N 223226. Has had only 3 months use. Only $9,500.

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BUCYRUS-ERIE cab for model TD-9 tractor. Excellent condition. U-76 $100.

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1—Used R.C.A. Metal Detector—10" x 36" aperture.
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9—New WELL DRILL BITS—3¼" x 4¼"—7 API Joints.
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Low pressure air cylinder diameter . . 20"
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Sullivan Horizontal Drill. Good condition, drilling 6-in. hole. Walter Robertson, Harmon Creek Coal Corp., Florence Mine, Burgettstown, Pa.

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1—Slightly used 3-cu. yd. type BM, Bucyrus-Erie medium weight dragline bucket with all fittings. Weight 4,700 pounds. Special reduced price $2,900 f.o.b. Evansville, Ind.
1—Used 3½-cu. yd. type BM—perforated—Bucyrus-Erie medium weight dragline bucket with all fittings. This bucket has a new lip with adapters and teeth. Weight 5,500 pounds. Special reduced price $3,050 f.o.b. Evansville, Ind.
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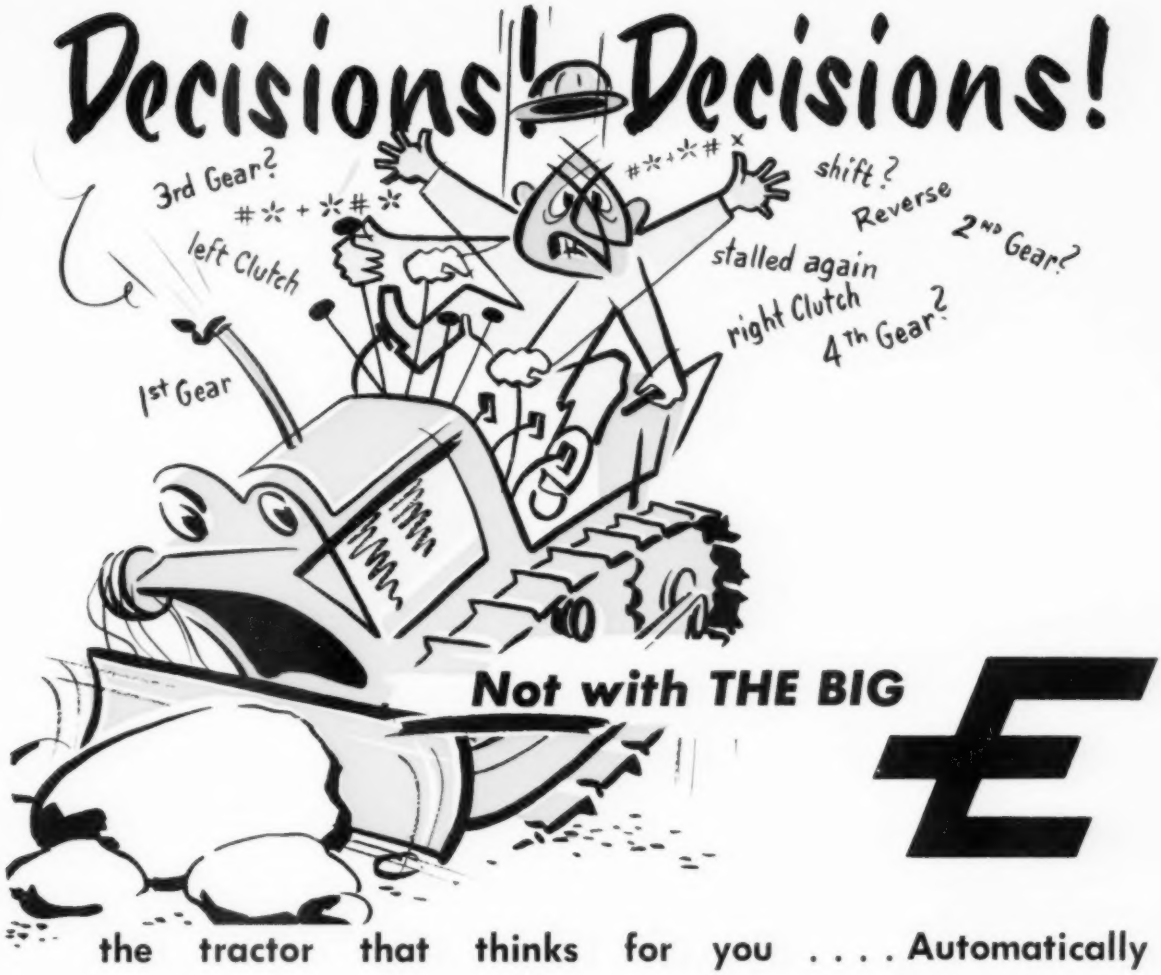

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the tractor that thinks for you . . . . Automatically selects the right power ratio for any load or strain!

Just one of the many job-time and man-hour saving features of the modern Eimco 105 is the exclusive torque converter-Unidrive team, the only drive and transmission that is engineered with oil cooled, positive engagement clutches that never . . . really never . . . need adjustment. No master-clutch to wear out! No clutch pedal to push! No gears to shift!

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PROOF OF THE DIFFERENCE IN THE CAT "HI-ELECTRO" HARDENED CUTTING EDGE

Whether loading scrapers or bulldozing, the cutting edge takes more punishment than any other part of the machine—more punishment today than ever before. New, larger, more powerful machines put greater demands on cutting edges. And the edge that's holding up best and lasting the longest is the Cat "Hi-Electro" hardened cutting edge—the edge with the difference. From all over the country, documented results from on-the-job comparative tests with other makes of edges confirm this fact. The best buy is the Cat edge.

ROUGH JOBS like this put cutting edges to severe tests. And here is where tough Caterpillar edges prove their superiority.

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Field tests prove that the edge with the difference, the Cat cutting edge, not only outwears other make edges of the same thickness; it even outlasts the thicker edges of other manufacturers. The reason: Caterpillar engineers perfected a hardening process to give steel the right blend of toughness and hardness—toughness to prevent breaking, hardness to prevent bending and rapid wear.

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Quality edges start with quality steel, tested in Caterpillar's laboratories for the right chemical composition and physical characteristics. Only steels meeting these exact specifications are accepted, and further tests are made at every stage of production.

CROSS SECTION of edge showing armor-like case and its shock-absorbing core.

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New multi-section 'dozer edges developed by Caterpillar for the D8 and D9 show the way to reduced blade costs and easier blade changing. Reduced blade costs can result from piece-by-piece replacement. You can now reverse and replace the worn sections. Changing is easier than ever before.

• • •

Service tip: When installing new or reversing "Hi-Electro" hardened edges, clean all dirt from the matching surfaces. Be sure that all bolt heads are properly drawn in to their holes and correct nut torque applied. This assures proper cutting edge support and maximum strength.

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Your Caterpillar dealer has the complete story on the advantages of using the new Cat multi-section 'dozer edges. He backs you with dependable, round-the-clock service and parts you can trust. See him today!

NEW EDGES are now available for the D8 Bulldozer in left and right sections shown here. New edges for the D9 come in left, center and right sections.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR

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